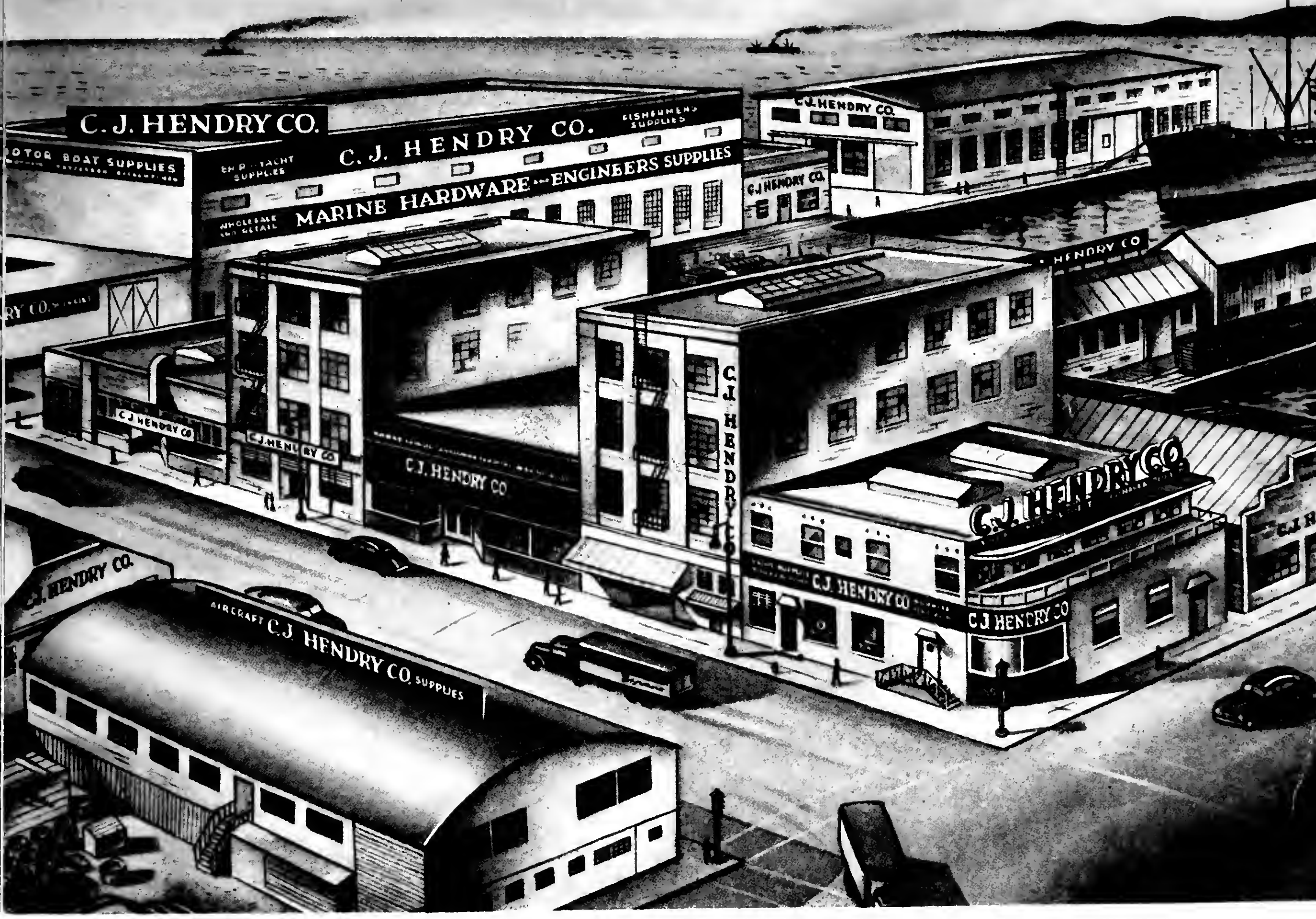
JANUARY 1949

Pacific MARINE REVIEW

"HENDRY CITY", illustrates the stores, warehouses, and lofts which one California ship's chandlery house maintains to give a complete marine service. These actual C. J. Hendry buildings are located in San Francisco, San Pedro, and San Diego, but pictured together, make a sizable "chandlery city". Teletype is used to facilitate operations, as well as to receive orders for incoming ships. Service like this helps build California ports.



Marine equipment . . . another builder of California ports

The many advantages of California ports are known the world over. One of the greatest is the fact that every type of craft can get whatever type of equipment it needs, without delay. In years past, shipment from an Eastern factory often took months. Western marine manufacturers and yards grew, and Western ship's chandlers began stocking marine supplies. The extent to which this has been carried is illustrated by the C. J. Hendry Co., who now probably carry the world's largest stock of marine equipment.

This company, since 1865, has literally become a factory branch for major marine manufacturers, and the owners of commercial and fishing vessels appreciate the convenience of having a single source for all their equipment, immediate delivery, and the same advantages as buying direct from the factory. Stocks are carried in San Francisco, San Diego and San Pedro. This type of operation has been most important to the growth of the shipping and fishing industries in California ports.

Pacific Marine Review

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Pacific MARINE REVIEW

Put History to Work For the Merchant Marine

HISTORY is called a narrative of the past. It stops with yesterday, but points the way out ahead. A look backward may inspire future actions.

There was a time when the merchant marine in England was the entire basis of national defense, and in fact the American Navy had its origin in the merchant marine. But one hundred years before that England was glad that its port cities had been given recognition.

The five major ports on the coast of Sussex and Kent, known as the Cinque Ports (meaning five), were Hastings, Sandwich, Dover, Romney and Hythe, and they were the most important maritime towns in the kingdom. As early as the time of Edward the Confessor (1042), these ports were given tax exemptions and other privileges in exchange for their undertaking the defense of the English Channel. They were later incorporated into an association, and were obligated to give the king certain sea services in the way of ships and men for national defense. In return they had many privileges and their quasi-privateers were about all the navy England had until after 400 years (1488) the Royal Navy built the *Great Harry* for its own. The number of Cinque Ports increased through the years to 39, and to this day the Lord Warden has certain perquisites, although the title, as are those of the sixteen Barons of Cinque Ports, is largely ceremonial. Winston Churchill was appointed Lord Warden in 1941.

The history of England, and of the world, would have been very different without that early recognition of the merchant marine as a medium of defense. Those ports had a real stake in the safety of the country and the country had a real stake—through easy times and hard—in the prosperity of the ports and shipping.

It is true that tough times bring strength while easy times lead to apathy. The merchant marine of today, in a postwar period of let-down, has to carry its responsibility for national defense as well as the apathy within and without its own industry. The unity of interest which many groups in the industry are coming to recognize is in a sense a back-stiffener. Shipyards, operators, suppliers, manufacturers, shippers, insurers and bankers are entitled, as are the defense units and the country as a whole, to have the industry given support and not attack, relief and not suppression. The legislative program of the National Federation is a good rallying point. All of us believe in it, and we can succeed in what we believe in.

Luckenbach West Coast Reconversions

James Sinclair
President of Luckenbach

WEST COAST SHIPYARDS will soon be the scene of increased reconversion activity, because of the expansion program currently being undertaken by the Luckenbach Steamship Co., Inc., of 120 Wall Street, New York, under the direction of James Sinclair, President and General Manager. Luckenbach has recently purchased eight C-3 type vessels from the Maritime Commission, seven of them being taken from reserve fleets on the West Coast, and one on the East Coast.

Plans and specifications now in the hands of bidders indicate the extent of reconversion work necessary on each of the ships to recondition all hull, machinery and electrical items. Since these vessels transported troops during the war, considerable work will be required to remove military installations and generally convert them to merchant marine standards.

Opening of bids in the offices of the United States Maritime Commission at Washington, D. C. is in the following sequence:

For the *Sea Star* and *Sea Flier*, on Dec. 29, 1948.

For the *Sea Cat*, *Sea Bass*, and *Sea Devil*, on Jan. 19, 1949.

For the *Sea Runner* and *Sea Barb*, on Feb. 2, 1949.

All technical details in connection with the reconversion program on the West Coast are being handled for Luckenbach by the firm of Michael J. Ryan, Naval Architects and Marine Engineers, of 149 New Montgomery Street, San Francisco, including the preparation of a condition survey report and reconversion plans and specification for each vessel.

Vincent P. McMurdo, Pacific Coast Manager for Luckenbach is in charge of the reconversion program on the West Coast, handling all of the details of the work between the Company and the Maritime Commission, while E. S. Ramey, Superintending Engineer for Luckenbach, is directing the engineering details required by the reconversion.

The principal data of the C3-S-A2 design are:

Length	492′—0″
Beam molded	49′—6″
Depth to Shelter Deck	42′—6″
Draft, Loaded	29′—4″
Shaft Horsepower	8500
Crew	54
Passengers	12

Six of the West Coast ships were built by the Western Pipe and Steel Company, and one by the Ingalls Shipbuilding Corporation. The Ex *Sea Star* is the Ingalls vessel, while the vessels built by the Western Pipe and Steel Co. are the Ex *Sea Devil, Sea Cat, Sea Bass, Sea Runner, Sea Barb* and *Sea Flier*. The *Sea Flier* and *Sea Star* are presently berthed at Seattle, while the other five are locat-

Vincent McMurdo
Pacific Coast Manager

ed in the San Francisco Bay area. The new names of the various vessels will be announced prior to the completion of the reconversion program.

Although the program calls for the reconversion of the vessels to substantially the same general characteristics of the basic C-3 Maritime Commission design, several noteworthy departures are being made.

All of the vessels will have accommodations for twelve passengers. In the case of the Sea Cat, accommodations will be aranged for two pasengers in each of six rooms; on the *Sea Star,* there will be accommodations for two passengers in each of three rooms, and for three passengers in each of two rooms; all other vessels will have the standard arrangement of three passengers in each of four rooms. Additional passenger facilities will consist of a passengers' lounge, which will be installed on the Cabin Deck, starboard side, forward. As planned, this lounge will be of sufficient size to accommodate all passengers, and is to have varying architectural and decorative features and color schemes on the different vessels, with Kearfott windows, carpet flooring, large panel mirrors, and custom built furniture. The forward athwartship passage on this deck will be closed off from the officers' quarters by the installation of doors at the fore and aft passages, and will also have decorative treatment, with rubber tile floor covering, as will all passages on the Boat Deck, where the passenger rooms are located.

All passenger state rooms will be treated in varying color schemes, with modern furniture installations and carpet floor coverings.

The officers and passengers dining room will be fitted out to accommodate 28 persons. Decorative features will be large mirrored walls and decorative murals, the design varying on the different ships. Special fabrics will be used in covering the chairs, and in draping the window openings.

Among other structural changes is the installation of a sheer strake doubling which will allow an increased draft of about 10″. The doubling will consist of a plate 24″ wide by ½″ thick, extending from midway between No. 1 and No. 2 hatches to midway between No. 4 and No. 5 hatches.

M. J. Ryan
Naval Architect

A pump room will be provided in No. 3 hold, aft of the deep tanks, for the handling of liquid cargo, and will be fitted out with a cargo pump, stripping pumps, and a ventilation system.

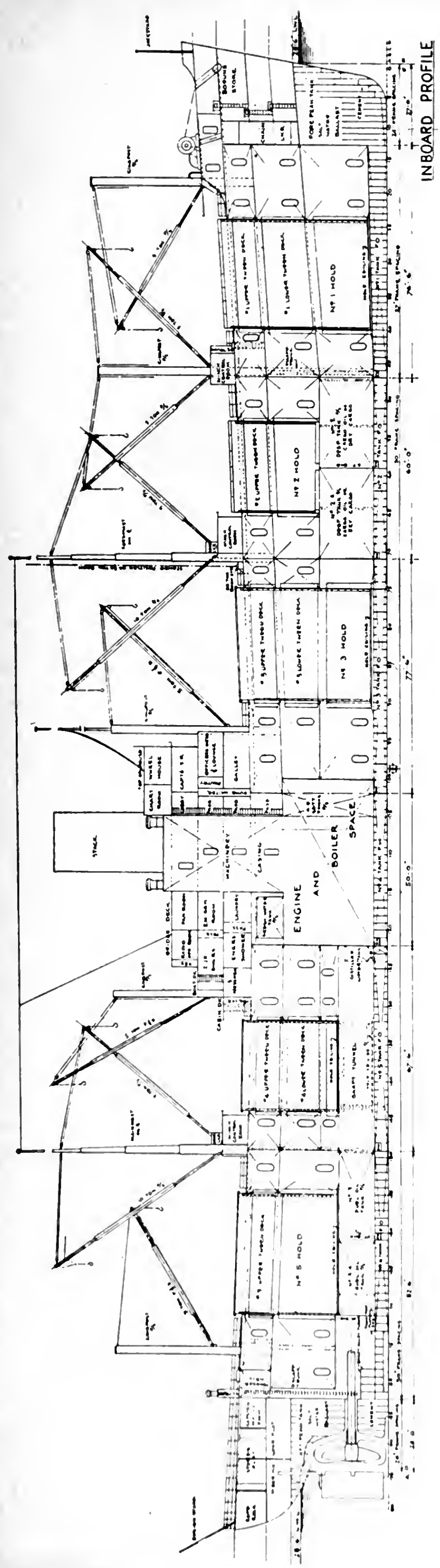
Boiler feed water control is being improved by the installation of a Coffin feed pump.

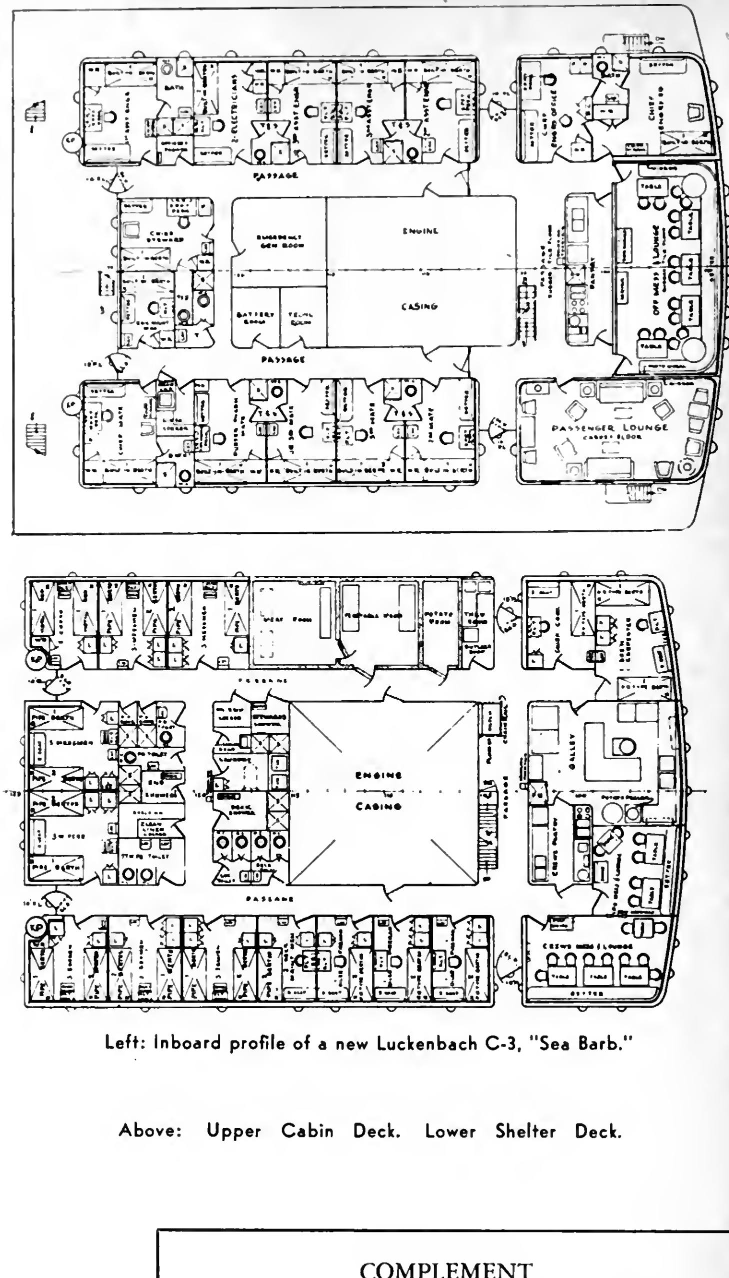
The main propulsion units, consisting of cross-compound High and Low pressure turbines and double reduction gear set will be thoroughly overhauled and the steam generating units will be reconditioned. All engine room auxiliaries also will be overhauled and put in good operating condition.

Six of the West Coast vessels are powered by General Electric main propulsion units and the remaining one by Westinghouse turbines.

Each vessel is equipped with two "D" type steam gen-

The S. S. "Mathew Luckenbach" (before conversion), ex "Sea Perch," built at Ingalls, Pascagoula, Miss. Others of the seven were built at Western Pipe & Steel Co., South San Francisco.





Left: Inboard profile of a new Luckenbach C-3, "Sea Barb."

Above: Upper Cabin Deck. Lower Shelter Deck.

COMPLEMENT

Deck	No.	Engine	No.	Steward	No.
Captain	1	Chief Engr.	1	Chief Stew'd	1
1st Mate	1	1st Asst. Engr.	1	Chief Cook	1
2nd Mate	1	2nd Asst. Engr.	1	2nd Cook & Baker	1
3rd Mate	1	3rd Asst. Engr.	1	Asst. Cook	1
Jr. 3rd Mate	1	Jr. 3rd Asst. Engr.	1	Messmen	9
Cadet	1	Jr. Engrs.	3		
Radio Oper.	1	Cadet	1		
Purser-Phar.	1	Electricians	2		
Bos'n	1	Oilers	3		
Carpenter	1	Firemen	3		
Maint. Men	2	Wipers	3		
Seamen, A.B.	6				
Seamen, Ord.	3				
Total	21	Total	20	Total	13

Crew 54 + Spares 0 + Passengers 12 = 66

erators, furnishing approximately 39,500 lbs. of steam per hour at 465 p.s.i.g. and 765°F when operating at normal capacity.

Two of the vessels are equipped with Babcock & Wilcox Boilers, four of them with Combustion Engineering

Co. boilers, and one with Foster Wheeler Co. boilers.

Power is supplied by three 300 K.W. Turbo generators located on the auxiliary flat.

The renewal and replacement work to be done varies somewhat from ship to ship, but new installations are fairly similar for all vessels. We will examine the specifications for the *Sea Flier.*

On the *Sea Flier* there is to be a new pump room in No. 3 hold, with a floor of subway grating above the tank top. A type 6 Worthington vertical rotary pump complete with Falk gearing and 50 h.p. motor, a 6" suction line and 6" discharge line, is to be installed, and also a Quimby stripping pump and Rotex for edible oil system. Leslie temperature regulators for controlling the flow of edible oil are specified. An exhaust ventilating system, consisting of a Clarage Ready Unit fan, will discharge through a gooseneck to the atmosphere above the resistor house.

Pontoon hatch covers on shelter deck hatches 3, 4 and 5, and sheer strapping port and starboard are required.

The cabin deck is to be rearranged as provided on the plans herewith. Johns Manville Marinite is prescribed in the joiner work, and Kearfott windows are to replace airports in the lounge.

A standby ice machine is specified with 7H5 Carrier Freon compressor which will be furnished by the owners. Also to be furnished by Luckenbach is a Yarway remote water level indicator for the D. C. heater at the main engine throttle platform, and a Coffin feed pump. It is understood that a complete Butterworth tank cleaning system has been recommended for servicing the cargo oil tanks. If installed, the Butterworth heater and drain cooler will be suitable for sea water and chemical cleaning fluid, and will have sufficient capacity to heat 400 g.p.m. of sea water from 40°F to 200°F. when supplied with steam at 35 p.s.i.g. pressure via a thermostatically controlled reducing valve, from boiler pressure desuperheated steam line. Drain cooler will be designed for an outlet temperature of 240°F. maximum. Drains will be led to D.C. heater.

The water side of heater and drain cooler will be designed for a working pressure of 250 p.s.i. and will be capable of withstanding a hydrostatic test of 500 p.s.i. Pressure drop of sea water passing through both heater and cooler will not exceed 7 p.s.i.g.

The heater will be designed for an overall coefficient of heat transfer "U" not to exceed 600, and the drain cooler not to exceed 300. Shells will be of steel, water heads of cast steel; tubes ¾" O.D. #16 B.W.G. 70-30 copper nickel; tube sheets of 70-30 copper nickel.

Drains from the drain cooler will be controlled by a float operated valve to maintain the condensate level in the drain cooler at the top of the drain cooler tubes and not in the heater. Two equalizing lines from the controller will be led (one to the heater and one to the cooler) at points of equal pressure. The float cage will be external to the valve.

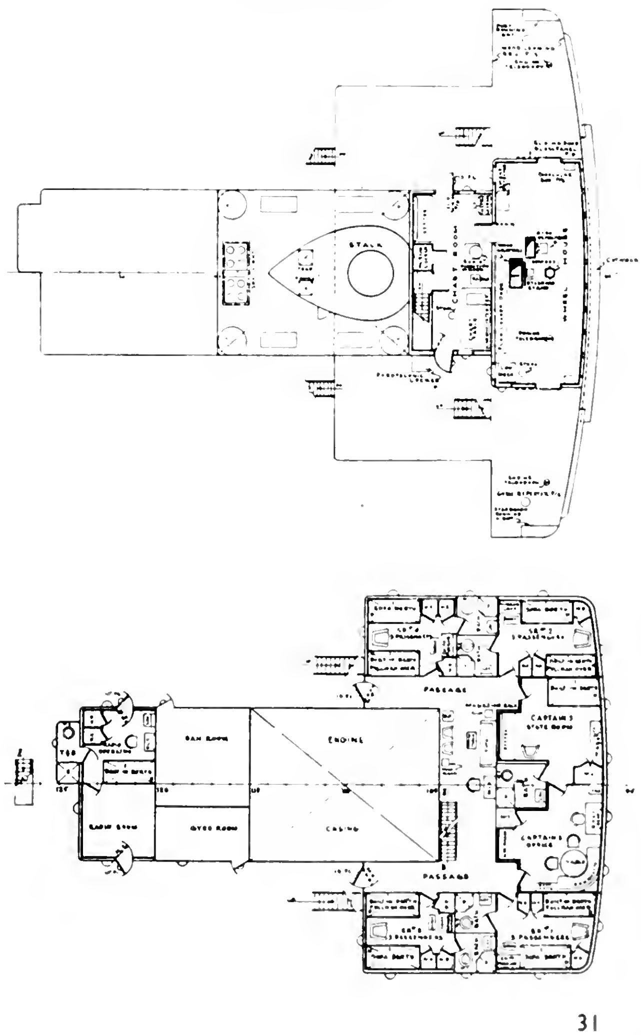
The Butterworth machines will be of such size as to permit a flow of approximately 100 g.p.m. through each nozzle with 175 p.s.i. at the nozzle.

After Butterworthing cargo oil tanks with hot salt water, chemicals such as sal soda or soda ash will be dropped into a tank and dissolved in hot water. The Butterworth pumps will then take suction from the tank via the cargo oil suction piping. This chemically treated water will be discharged by the Butterworth pump to the Butterworth drain cooler, heater and Butterworth machines.

And of course the big well-known *Luckenbach* name will be painted across the side of the vessel. Among the bidders for the five San Francisco Bay vessels—*Sea Flier Sea Cat, Sea Bass, Sea Devil* and *Sea Runner*—are: Bethlehem, Todd, General Engineering & Drydock, Triple A Machine Shop, Pacific Ship Repair, Puget Sound Bridge & Dredge, Moore Drydock, Everett Pacific, Columbia Machine Works, Willamette Iron Works and Consolidated Builders, Inc.

On the *Sea Star* and *Sea Barb* (at Puget Sound) there were ten bidders. By the time this is printed these two jobs and the one on the East Coast will probably have been awarded by the Maritime Commission.

Bridge Deck (upper) and Boat Deck (lower) on the "Sea Barb."



Propulsion Equipment For 12,500 HP Super Tankers

By FRANK V. SMITH
General Electric Company

THE DESIGN ENGINEERS had a lot in the back of their minds when laying out the machinery arrangement for the new 12,500-shp tankers. In the first place, they wanted to go completely modern and arrive at the absolute minimum fuel value possible without crossing over the borderline into what may be termed the area of "gold-plated" engineering. The trade route was long. On one side of the ledger appeared the favorable items,—high speed and increased turn-arounds; and on the other side of the ledger, the unfavorable item of high fuel weight and cost.

Slow speed ships become valueless because of their limited turn-arounds, and high speed ships equally valueless because their deadweight cargo carrying capacity is taken up by the weight of the fuel. For a ship of any given size and tonnage, there is an optimum value between the two extremes which gives the best overall economic results.

Juggling the three factors—speed, fuel consumption, and ship's tonnage,—to obtain a value which can be interpreted into terms of "minimum cost per ton mile for transporting cargo," requires a long series of calculations.

Great progress has been made in tanker design during the past twenty-five years. Ships have been made larger and speedier as more economical forms of propulsion apparatus have been devised. In the new ships the weight of the propulsion apparatus is being reduced to the irreducible minimum by selecting turbine-gear drive, which has the lightest weight per horsepower of any form of propulsion equipment. It is also the most economical form of turbine propulsion equipment because its transmission losses are low.

From a broad standpoint, overall economy in a steam power plant can be obtained by increasing the initial steam pressure and temperature on a progressive scale as the power rating of the equipment is increased; by including the regenerative method of heating the feed water with extraction steam; and by including a highly efficient auxiliary power plant.

The new ships are already being dubbed the "super tankers." When a tanker has a dead weight tonnage of 26,000 tons, carries 288,000 bbls. of cargo oil, makes 16 knots (or better), and carries a steam pressure of 850 lb.g. at a temperature of 850 F in her boilers, it really proves that the designers have gone to town. When one studies the steam and feed cycle of the new ships, and the unique method of co-ordinating the various elements of design, it also readily becomes apparentt that the bottom of the barrel has been scraped in this B. T. U. saving business.

Operating engineers may be interested in knowing a little of the inside dope regarding the type of research that preceded the building of modern marine power plants. Basically, engineering progress can only go ahead within the limitations of the metallurgical arts. In the early days when puddled wrought iron was the best metal available, and scotch boilers the only type of marine boiler in use, 100 pounds steam pressure was considered the ultimate. Carbon steels and water tube boilers opened up new possibilities and at the beginning of World War I, 200 pounds pressure and 50 deg. F superheat was considered quite modern. Steam pressures and temperatures were gradually increased, but even as late as 1925 the best central station practice on shore hovered around the 350 lb. 600 F mark. The metallurgists got busy again, added molybdenum to their steel, and stopped the metal growth that took place at high temperatures. Exhaustive experimentation and testing procedures were set up and, in addition to the creep factor, heat shock and many other characteristics of metals were studied. Today, metals are available which will operate continuously at temperatures of 1050 F and pressures of 2000 lb.

The mathematicians, on the other hand, have calculated feasible steam pressures up to 5500 lbs. at 1600 F.

When one looks back and compares the steam conditions of the new tankers with those of the T2 tankers they may appear high, but looking the other way, at modern central station practice, they appear only moderate.

Except for the difference in the type of metal used in the manufacture of the boilers, piping, valves and turbines. it doesn't make a great deal of difference, as far as safety is concerned, whether the operating engineer is

playing around with 450g-750 F steam or 850g-850 F steam. It does make a difference, however, in the corrosion factor in his boilers, and he wants to make sure that he knows all about feed-water de-aeration before he tackles the job. Corrosion takes place rapidly at high temperatures if the free oxygen is present in the feed-water.

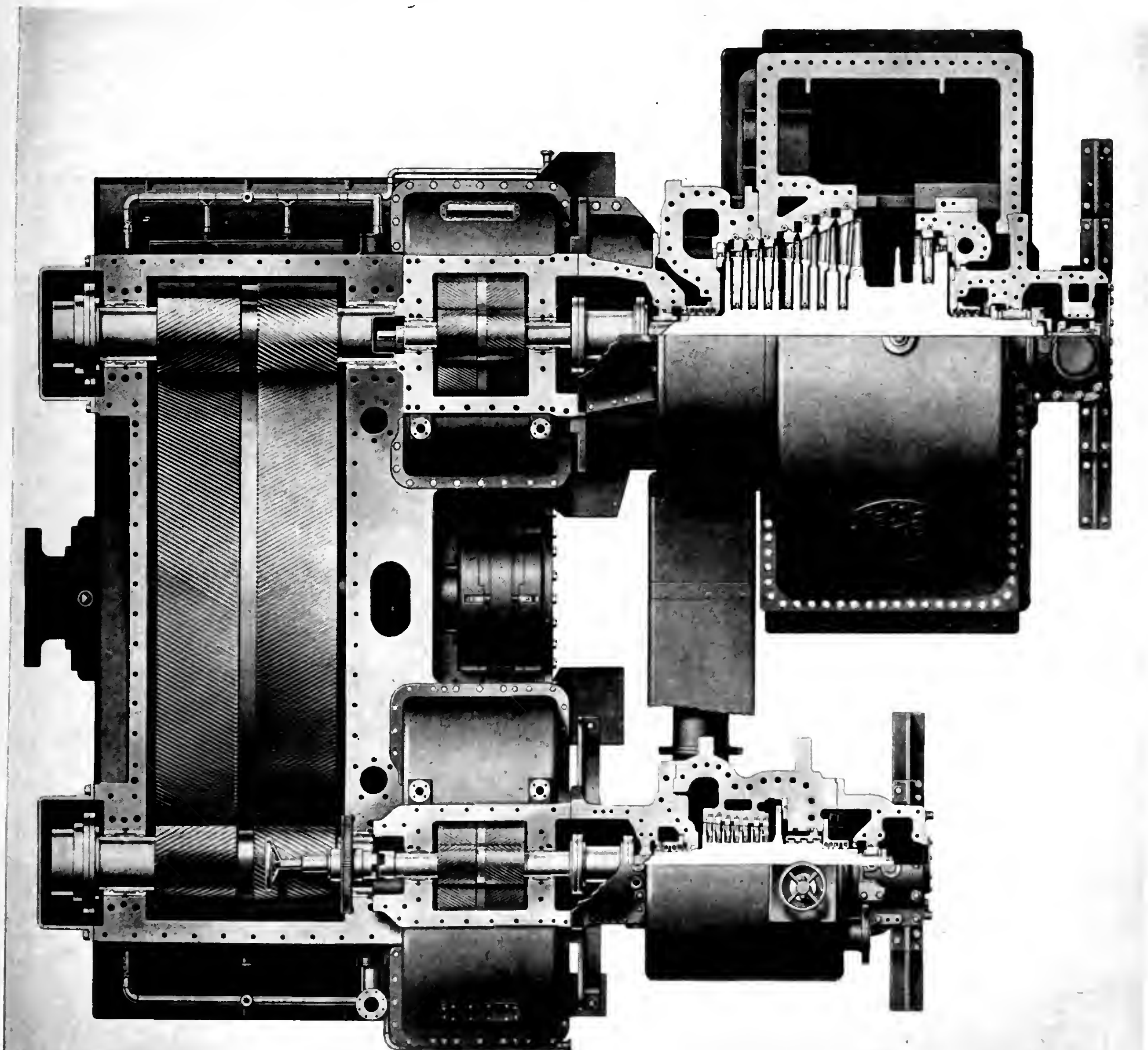
The General Idea Underlying Modern Steam Power Plant Design

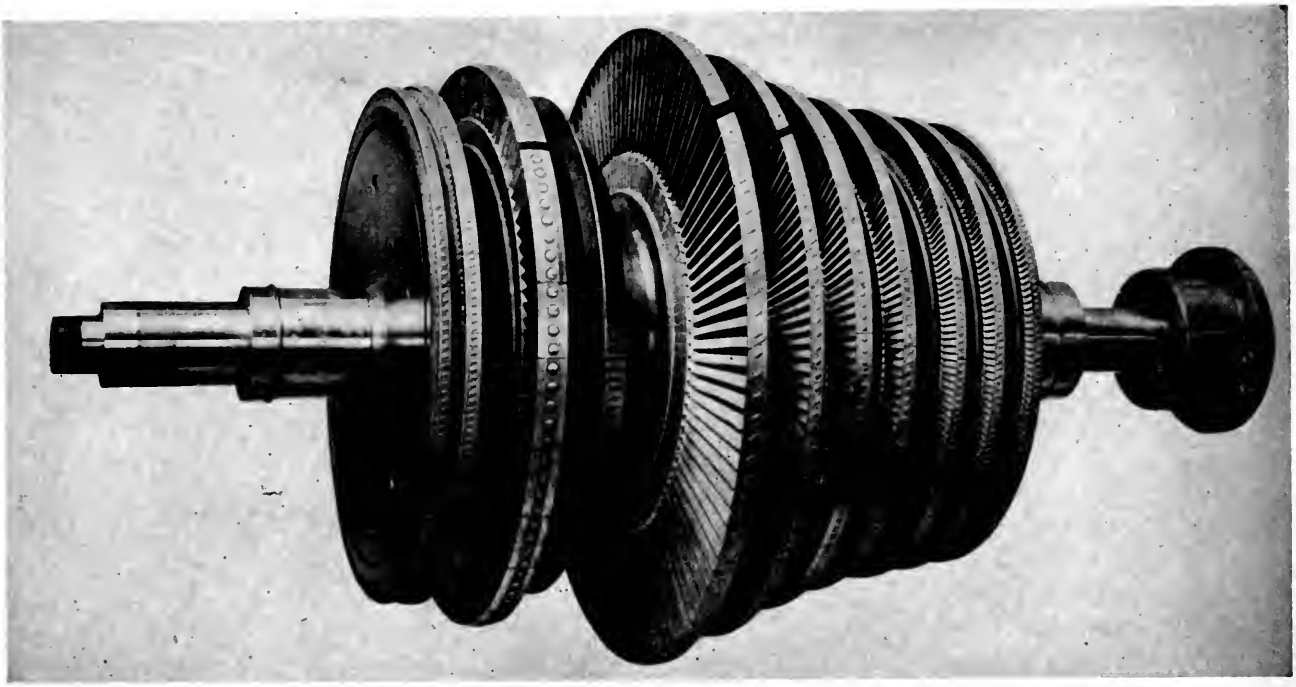
Briefly stated, there are three ways of increasing the overall fuel economy of a steam power plant; one, generate the maximum amount of steam with the minimum fuel; two, convert the heat energy in the steam into maximum amount of useful power; and three, return the maximum amount of low head heat to the system.

All of the foregoing elements are closely co-related and interdependent, and in the new tankers provision has been made for obtaining the best economy in the three respective fields. The boilers are fitted with automatic combustion controls and measures taken for maintaining low stack temperatures.

The main turbines, and turbines driving the auxiliary generators, operate at high initial steam pressures and temperatures and are the most efficient of their type. Hand valves are provided on the propulsion turbines to minimize throttling losses. Four extraction openings are provided in the turbine, which furnish steam for heating the feed-water in progressive steps. Low pressure steam

General Electric cross-compound turbine for marine propulsion with double-reduction gear unit. Wash-drawing of top view with parts in semisection. This is typical of those being installed in new super tankers.





Rotor for low pressure element of G. E. cross-compound geared marine steam turbine. Reversing stages in foreground.

is also available from the same openings for use in the first stage coils of evaporators, and for heating purposes. The extraction feature reduces the steam entering the condenser to a minimum, and boosts the feed-water temperature to a maximum. Drain coolers are also provided for salvaging the heat contained in the miscellaneous drips.

From the foregoing arrangement it is easy to visualize that the main turbines are the heart of the power system. In one way, they are very similar to turbines built for industrial plants requiring large amounts of process steam.

Description of Propulsion Turbine Gear Units

The propulsion units being furnished by the General Electric Co. for a number of the new tankers, consist of a cross-compound, impulse type of steam turbine, and a double reduction gear with the main thrust bearing incorporated in the forward end of the gear casing. The unit is compact and so arranged that the condenser can be underslung directly beneath the turbine and be bolted directly to the exhaust casing of the low pressure element with metal-to-metal contact.

The steam conditions at the superheater outlet of the boiler, are 850-lb.g.850 F. Allowing for a nominal pressure and temperature drop between the boiler and turbine it is expected that a steam pressure of 835 lb.g. and temperature of 840 F can be consistently maintained at the turbine throttle. The turbines are designed for a back pressure of 1.5 in.Hg. absolute or 28.5 in. of vacuum referred to a 30 inch barometer.

The units are designed to deliver 12,500 s.h.p. at 112 r.p.m. under normal operating conditions, and 13,750 s.h.p. at 115.7 r.p.m. under maximum conditions. Under light draft operating conditions the unit is capable of operating continuously at maximum s.h.p. providing the propeller does not exceed 123 r.p.m.

Ample provision also has been made in the turbine design for fluctuations in steam pressures and temperatures. The maximum continuous pressure is limited to 885 lb.g. and on momentary swings to 960 lb.g. Temperature is more of a limiting feature in turbine design than pressure, as a continuation of high temperature affects the life of a turbine. For this reason a time limit is placed on high temperature operation. For the units under consideration a temperature limitation of 875 F. has been set for operating periods aggregating not more than five per cent of the time, and at 900 F for periods aggregating not more than one per cent of the time.

The astern turbine is incorporated in the low pressure casing of the turbine. It will develop 80 per cent of rated ahead torque at 50 per cent of rated ahead r.p.m.

The turbines are also arranged for emergency operation should anything happen to either the high-pressure or low-pressure element. Flanged openings, blank flanges, filler rings, and orifices are provided for making the temporary steam connections.

The Reduction Gear

One of the most interesting phases of modern marine engineering progress is the successful development of double reduction gearing. Today gears of this type are available in all powers up to the limitations set by propeller design. Machine tools have been developed for hobbing helical-type teeth on gears up to 200 inches in diameter. To maintain the accuracy required for successful operation the machining is carried out in buildings where the temperatures are accurately controlled.

The meshing arrangement of the reduction gears being furnished for the new tankers by the General Electric Co. is known as the two-pinion articulated type. The

gear tooth form is the double helix or herringbone type. The articulated type of gear is very flexible as the two high speed pinions each drive their own train of high speed gears without a locking arrangement between the two high-speed elements.

The gear casings are fabricated out of heavy steel plate, welded, and then annealed to relieve all internal stresses. Flexibility between the turbines and the high speed pinions is provided by flexible couplings. The low-speed pinions are driven by means of quill pinions connected through flexible couplings. This arrangement places the flexible couplings at the after end of the gear casing where they are accessible.

All rotating elements are dynamically balanced, and tooth contours are checked by scientific instruments especially designed for the purpose.

Looking at the Problem of Operation From the Engineer's Point of View

Almost every operating engineer, before being assigned to a new ship, would like to know wherein the differences arise between what he has been operating in the past, and what is aboard his new ship.

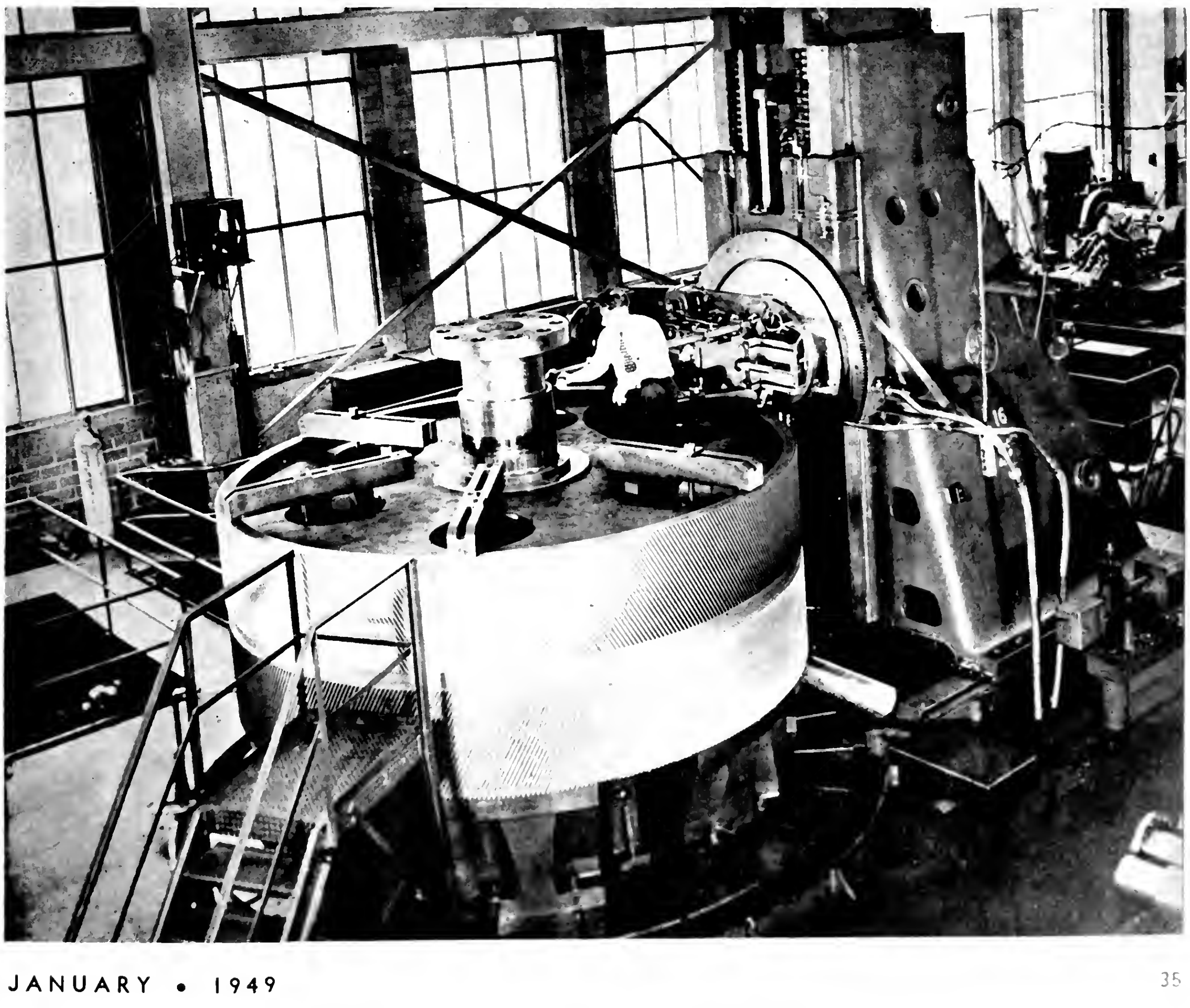
Looking first at the subject of power rating, there is no fundamental difference in the operating procedure on a 12,500 shp turbine-gear unit, and one rated 6000 shp. Both units must first be operated with a turning gear during the warming-up period, and heated gradually to allow all parts to expand uniformly. All turbines require proper draining of condensate during this period.

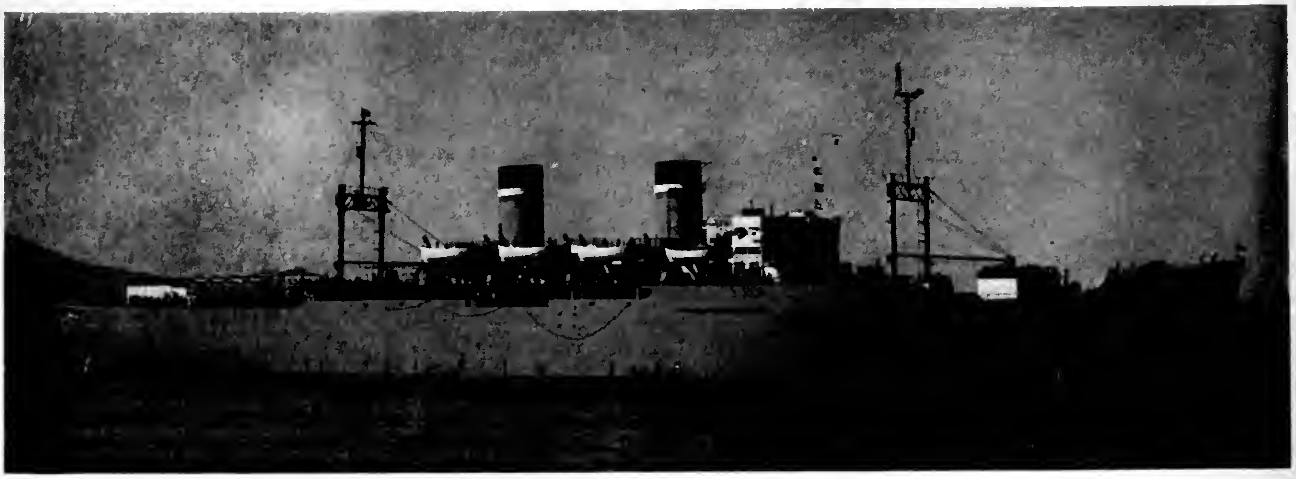
Turbines, regardless of size, also require gland seals where the shaft penetrates the casing; a lubricating oil system; a steam governing system and a protective device system which effectively closes off the steam supply to the turbine in case of overspeed, and low-pressure oil supply.

Eliminating the features which are common to all turbines leaves only the initial pressure and temperature of the steam as a new factor. As the steam progresses through a turbine the pressure and temperature of the steam drop very rapidly. By the time the steam has passed through the first stage nozzles, there is no fundamental difference between a turbine built for high pressure and one built for moderate pressure.

(This article will be continued in the February issue)

Low speed gear being aligned for final cut on 200-inch hobbing machine, for G. E. speed-reducing gear.





The "General Nelson M. Walker" before conversion.

P-2 Transport Conversion at Todd's

MAJOR CONVERSION of the USAT *General Nelson M. Walker,* a P-2 type vessel, has been completed by Todd Shipyards Corporation, Los Angeles Division. The vessel is operated by the Army Transportation Corps, San Francisco Port of Embarkation.

The conversion was in line with the ATC's current program to modify all transports to comply with the latest U. S. Coast Guard "safety-at-sea" requirements. It consisted of the installation of new equipment and materials for further fireproofing the vessel; the provision of complete lifeboat coverage by installing 14 sets of Welin davits and 22 Welin lifeboats complete with provisions on the boat deck. There are also thirty 20-person life rafts arranged to float free. In addition, improvements to passenger accommodations were effected.

The fireproofing and fire control demands were fulfilled by installing 95 tons of new steel and 28,000 square feet of Marinite bulkheading; 90,000 square feet of magnesite floor covering; 1,000 square feet of ceramic tiling; magnetically controlled fire screen doors (controlled from bridge deck fire control room by master switch in addition to being locally controlled); new power-operated sliding watertight doors, Cutler-Hammer controlled, between and in the forward and after engine rooms; and a new Paul W. Hiller installation of Kidde CO_2 detecting and extinguishing system for the cargo holds, storerooms, machinery spaces, emergency generator room and motion picture booth, with additional portable fire equipment placed at strategic locations.

New extensive electrical systems and alterations were installed which included an automatic electrical closed circuit fire detecting and alarm system. Manual fire alarm stations were also installed. New general alarm and ship's Remler loud speaker systems servicing the passageways, public spaces, berthing and machinery spaces were finished with the master controls located in the wheelhouse. The existing emergency power and lighting system was altered to provide three separate emergency systems in case of power failure; one through the main board, another by the diesel generator set and the third by the batteries.

Passenger and troop recreational and comfort facilities were increased by the installation of passenger lounge, smoking room, children's playroom, baggage rooms, four large troop toilets, 200 air ports, and a fresh water chlorination system which was installed by Bennett Marine Utility Co. Windows in the pilot house are Kearfott.

In addition to the above, six new ventilation systems complete with blowers and heaters were installed, together with extended duct work to the existing systems.

Rubber tiling was laid in the public spaces which also were provided with the latest type of Arnot marine aluminum frame furniture.

General Alterations in the profile, as distinguished from the view of the vessel herewith, include the cutting down of the flying bridge, addition of life boats, and the removal of the radar antenna from the kingpost to a special mast just aft of the pilot house. The Navy radar was replaced by a new Radiomarine commercial type. The ATC stack insignia was added.

The vessel was not drydocked but was inclined at the pier.

Foreign Tankers

Among European Tankers Motorships Prevail

EDITOR'S NOTE:—The December Pacific Marine Review contained extended description of American-built tankers. Europe has a great tanker building program also, with the major differences being in size and propulsion. Most of Europe's ships are diesel. We expect to elaborate on many of these ships during the coming months.

THE CONSTRUCTION of large tankers is an important branch in the great business of Harland and Wolff, Ltd., whose principal establishments are in Belfast (North Ireland) and Glasgow (Scotland). Recent completions include the following: Motor tanker *Jalta*, of 12,000 tons deadweight, for A/S Bulls Tankrederi, a Norwegian concern; the motor tanker *British Security*, of 12,280 tons deadweight, for the British Tanker Co., Ltd., London; the motor tanker *British Ranger*, of 12,280 tons deadweight, also for the British Tanker Company; the motor tanker *Lingula*, of 6,445 tons gross, for the Anglo-Saxon Petroleum Co., Ltd., London; the motor tanker *Liparus*, of 9,000 tons deadweight, also for the Anglo-Saxon Petroleum Company; and the *Empire Grenada*, a motor tanker of 12,000 tons deadweight, for the British Admiralty.

"Jalta"

The Motor Tanker *Jalta*, the first of an important group of tankers which Harland and Wolff are building for Norwegian Owners, has been completed at the Company's Belfast Yard, and handed over to her Owners, A/S Bulls Tankrederi at the conclusion of her sea trials.

The principal dimensions are as follows:

Length overall, about	487′ 6″
Length between perpendiculars	460′ 0″
Breadth moulded	59′ 0″
Depth moulded	34′10″
Deadweight about 12,000 tons on 27′6″ Draft.	
Gross Tonnage	8,247

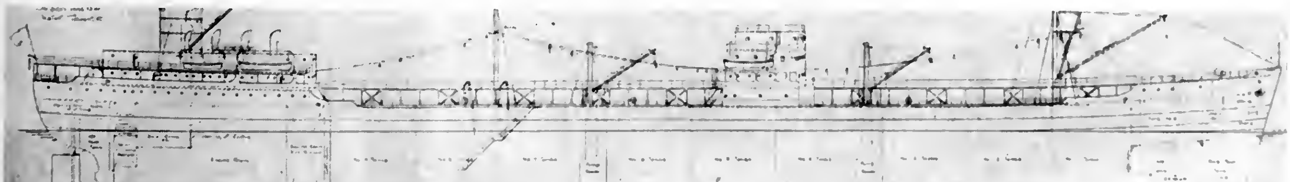
The vessel has a cruiser stern, modern type semi-clipper stem rounded above waterline, stump fore mast, telescopic signal mast amidships and streamlined funnel; constructed on the combined longitudinal and transverse system of framing there are two main longitudinal bulkheads with transverse bulkheads forming 24 main cargo oil tanks.

There are two Main Cargo Pump Rooms, auxiliary Pump Room forward and all necessary cofferdams. A gastight cargo Hold and Tween Deck forward is provided and below this Hold is a Deep Tank for Oil Fuel or Water Ballast. Oil Fuel is also carried in Deep Tanks forward of the Motor Room and in Double Bottom Tanks under the Motor Room.

The most modern equipment is fitted for the efficient and rapid working of the vessel, including steam driven pumps for dealing with the cargo oil.

Accommodation of a very high standard is provided throughout, that for the Captain, Owners and Officers being amidships, together with a comfortable Dining Saloon adjacent to the Captain and Owners Rooms. The Engineers, Petty Officers and Crew's rooms are arranged aft, together with an Officers' and Engineers Smoke

Outline profile of a series of 24,800-ton deadweight tankers at present under construction by the Furness Shipbuilding Company for American and Scandinavian owners.



Room and a Laundry.

Ventilation of the Accommodation is carried out by a mechanical system, in conjunction with warm air heating to suit the special service conditions of the vessel.

Winches, Windlass and Steering Gear are steam driven, steam being supplied from oil fired auxiliary boilers.

The lifesaving appliances include four steel lifeboats, two of which are fitted with a motor, and the davits are of Columbus "Lum" type.

The propelling machinery for this vessel is supplied by the Builders and is of the well-known Harland-B & W. single-acting four-stroke type of Diesel engine, having six cylinders 740 m/m diameter by 1500 m/m stroke, working on the under-piston system of pressure induction. The engine is conservatively rated and provides the necessary power at 115 r.p.m. The propeller is of manganese bronze and is solid, four bladed.

The main frames and the bedplate are of fabricated steel construction. The main thrust block is incorporated in the bedplate and is of the Harland-B. & W. type with single fixed shoe between two collars on the thrust shaft.

The cylinder liners, covers and exhaust valves are cooled with fresh water. The pistons are cooled with oil from the lubricating oil system for the main engines, which is complete with tanks, pumps, filters, coolers and purifiers.

The essential engine room pumps—sea water circulating, lubricating oil and fuel oil surcharging—are all driven direct by the main engine. The other auxiliaries, with one or two exceptions, are steam driven.

The steam for the auxiliaries is generated in two single-ended multitubular boilers, the heat being obtained from the exhaust from the main Diesel engine when the vessel is at sea. Additional steam can be obtained readily by independent oil firing with forced draught.

Fresh water is made up in the tanks by an evaporator, a high pressure distiller and an auxiliary condenser.

Air for starting and maneuvering is stored in two air reservoirs, the air being supplied by two steam driven compressors of Builders' make. There is also a small electric-motor-driven emergency unit.

Electric power, supplied by two D.C. generating sets, one driven by steam and the other by a Diesel engine, is used for electric lighting and wireless, and for driving fans, refrigerator machines and purifiers.

An efficient exhaust silencer, in which is incorporated a spark arrester, is fitted inside the funnel.

A storeroom, and a workshop with lathe, drilling machine and grinder, all motor driven, are arranged in the engine room.

The electrical installation is carried out on the 110 volts D.C. double wire system, the current being supplied by one 40-kw diesel generating set and one 40-kw steam driven generator. The main switchboard which is of Builders' manufacturer, is of the open type with separate busbars provided for the steam and diesel driven

The Gotaverken system of corrugated bulkheads in tankers. Top and bottom: A 13,000 D.W. ton vessel. Center: A 23,000 ton ship.

generators.

There are approximately 500 lighting points, including berthlights and high candle power lanterns for Engine Room lighting, boat overside and cargo floodlights.

The vessel is installed with a complete wireless installation, electric whistle control, echo sounding gear, gyro compass equipment and Radar. There is also a complete installation of loudspeaking telephones, and a system of crew alarms fitted throughout the vessel controlled from a push in the Wheelhouse.

Emergency lighting is provided by a number of Nife safety handlamps fitted throughout the vessel.

M. V. "British Security"

This is a single screw motor-driven Oil Tanker for the British Tanker Company Limited, and the new vessel has been officially handed over.

The following are her principal dimensions:—
Length between perpendiculars .... 463′0″
Breadth moulded .... 61′6″
Depth moulded .... 34′0″
Deadweight about 12,280 tons on 27′6″ Draft

The vessel has a raked stem and cruiser stern and is constructed on the combined longitudinal and transverse system of framing with two longitudinal bulkheads, and divided by transverse bulkheads into 27 oil carrying compartments.

The electrical installation on this vessel is carried out on the exposed double wire system, current being supplied from two 75 kW. 110 volt generators, each coupled to an engine operating on a steam pressure of 120 lbs. per sq. inch through a main switchboard and one masterboard. The main switchboard is of the open type, consisting of polished and enamelled Sindanyo insulating panels. The generator panels are fitted with circuit breakers complete with overload and reverse current devices suitable for running the generators in parallel.

The installation is sub-divided into the following circuits through the main switchboard, Engine Room auxiliaries, Engine Room and Accommodation, Ventilation, Aft Accommodation Lighting and Small Power, Aft Lifeboat Winches, Wireless and Radar, Amidship Forward Lighting and Power.

M. V. "British Ranger"

This ship was completed at their Govan Shipyard, a single screw motor-driven Oil Tanker for the British Tanker Company Limited.

The following are her principal dimensions:—
Length between perpendiculars .... 463′0″
Breadth moulded .... 61′6″
Depth moulded .... 34′0″
Deadweight approx. .... 12,280 tons.

"Lingula"

This is a new motor-driven Oil Tanker built at Belfast for The Anglo-Saxon Petroleum Co. Limited.

Principal dimensions:—
Length overall, about .... 446′0″
Length between perpendiculars .... 425′0″
Breadth moulded .... 54′3″
Depth moulded .... 31′0″
Gross tonnage 6,445

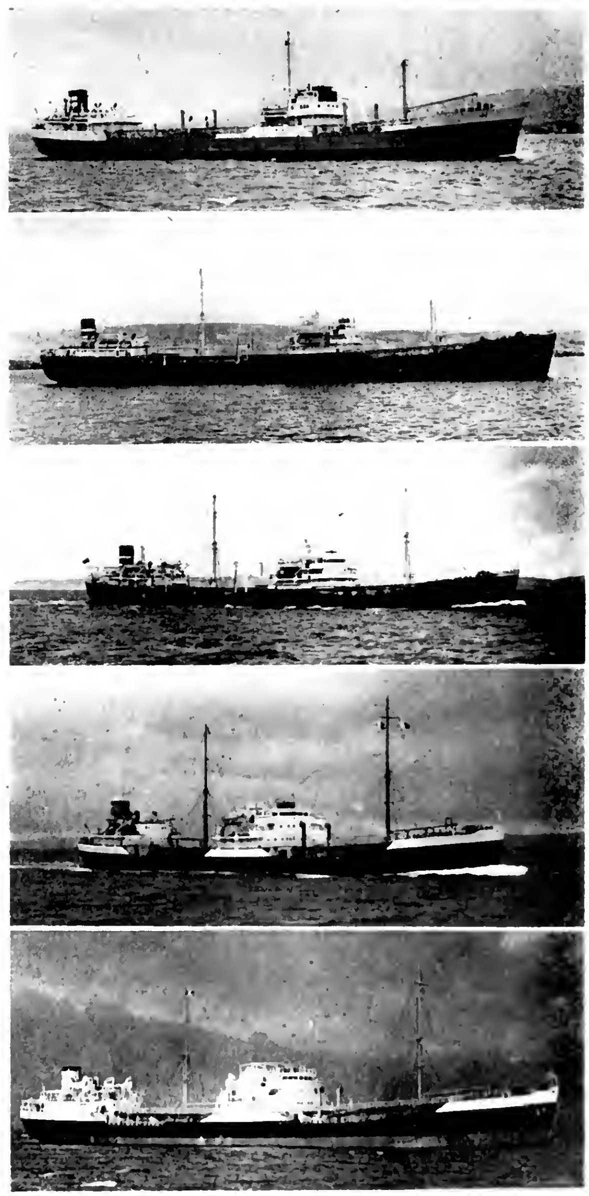
"Liparus"

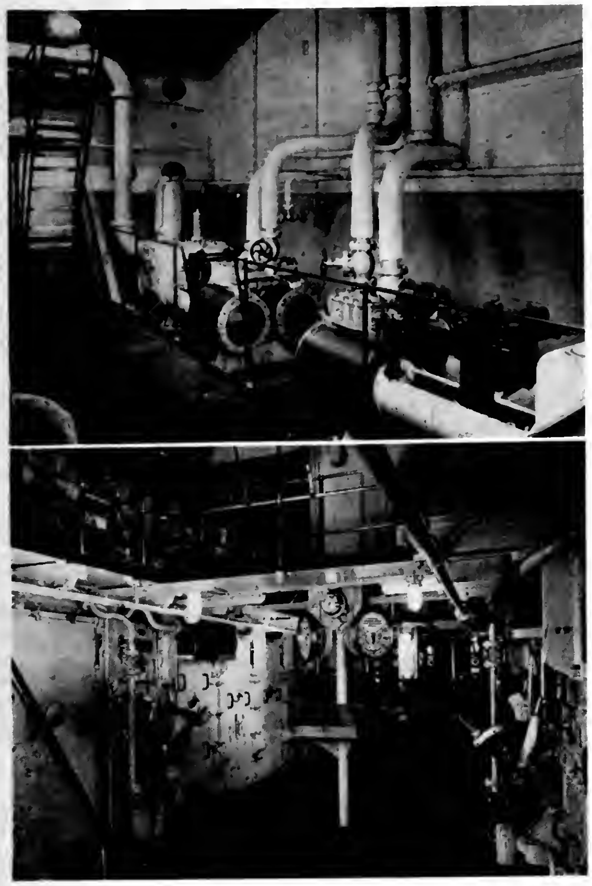
The principal dimensions of this vessel, built for The Anglo-Saxon Petroleum Company, Limited, are as follows:—
Length between perpendiculars .... 425′0″
Breadth moulded .... 54′3″
Depth moulded to Upper Deck .... 31′0″
Deadweight about 9,000 tons on .... 25′6″ draft.

"Empire Grenada

This motor-driven Oil Tanker for the Admiralty M.S.

A group of Harland & Wolff-built tankers.
Top to bottom:
"Jalta"
"British Security"
"British Ranger"
"Liparus"
"Lingula"





Top: Pump room of the Esso Nyborg.
Bottom: Maneuvering stand in the Engine Room of the Esso Nyborg.

Department has the following principal dimensions:—
Length between perpendiculars..................460′ 0″
Breadth moulded .... 59′ 0″
Depth moulded .... 34′10″
Deadweight (approx.) ....12,000 tons

One Motor Tanker Record

In August, 1948, the Anglo-Saxon Petroleum Company's motor-tanker *Auricula* completed two years' service, and, in order to ascertain the wear rate of certain parts, more than usual opening up was carried out at the second dry-docking. In view of the world-wide interest which is being taken in the problem of burning boiler fuels in Diesel engines, the notes herewith are of particular importance.

It will be recalled that the main Werkspoor/Hawthorn 4,000 I.H.P. Diesel engine in this Anglo-Saxon tanker was specially fitted to burn boiler fuel of 1,500 secs. Redwood I at 100°F. The ship was commissioned in August 1946 and has operated with entire satisfaction ever since, no delays at sea or in port being recorded. During the two years' service 132,350 miles between pilot vessels have been covered in regular trading across the Atlantic.

The ship was in the Tyne recently undergoing the second periodical drydocking, the first taking place in August 1947, and six of the eight pistons were removed solely to gauge the cylinder liners and piston rings for wear. In every case the rubbing surfaces of the liners were perfectly smooth and entirely free from marks of any kind. As is usual, the greatest wear had taken place near the top of the liners and the wear in millimeters at points 4″ down was found to be:—

	No. 1	No. 2	No. 3	No. 6	No. 7	No. 8
F. & A.	0.80	0.70	0.90	0.78	0.95	0.95
P. & S.	1.30	0.90	1.40	1.20	0.81	1.10

Since the ship was commissioned the engine has operated at full power between pilot vessels for 11,378 hours and the revolutions total 76½ millions, so that the average wear of these six cylinder liners per thousand hours and per million revolutions is:—

per 1,000 hours..................0.087 m/m or 2.21/1000″
per 1,000,000 revolutions 0.013 m/m or 0.33/10000″

These wear rates show a marked improvement upon the August 1947 figures given in Mr. John Lamb's paper read before the Institute of Marine Engineers on December 9, 1947. The figures then were 0.104 m/m and 0.015 m/m per 1000 hours and per million revolutions respectively. As explained in the paper referred to, during the first year's service the main engines were operated under very unfavorable conditions in order to collect data. For example, the engine was run for long periods at slow speeds, as would be necessary in the event of fog, and on other occasions the engine was operated continuously for many hours with a greatly reduced supercharge air pressure to ascertain the effect upon combustion efficiency.

At the present rate of wear it will require 70,000 hours or 12 years normal operation for the maximum enlargement of these 650 m/m diameter cylinder liners to reach 6 m/m. In that time the ship will have covered approximately a million miles.

The piston rings originally fitted were of standard

Lloyd's Register of Shipping, in its Shipbuilding Returns for the quarter ended September 30, 1948, publishes the following:—

Oil Tankers under Construction in Europe

The following Table shows the number and gross tonnage of steamers and motorships, each of 1,000 tons and above, intended to carry oil in bulk, under construction in Europe at the end of September, 1948:—

Country of Build	Steam No.	Steam Tons gross	Motor No.	Motor Tons gross	Total No.	Total Tons gross
Great Britain & N. Ireland	4	51,850	57	558,425	61	610,275
British Dominions, Colonies, etc.	1	4,580			1	4,580
Belgium			3	31,287	3	31,287
Denmark			5	55,066	5	55,066
France	3	27,320	4	51,515	7	78,835
Holland			2	11,500	2	11,500
Italy			2	10,900	2	10,900
Norway			2	3,552	2	3,552
Spain			3	24,904	3	24,904
Sweden			13	133,000	13	133,000
TOTAL	8	83,750	91	880,149	99	963,899

LARGE EUROPEAN TANKERS ON ORDER

Owners	Builders	Tonnage D.W.C.	Length ft. ins.	Beam ft. ins.	Engine Power b.h.p.	Speed knots
Fearnley and Eger	Furness S. B. Co.	24,500	560 0	90 0	6,800	14
H. M. Wrangell and Co.	Furness S. B. Co.	24,500	560 0	80 0	6,800	14
Anders Jahre	Furness S. B. Co.	27,000	630 6	78 0	6,800	14
Erling H. Samuelsen	Furness S. B. Co.	24,500	560 0	80 0	6,800	14
Sam Ugelstad	Furness S. B. Co.	24,500	560 0	80 0	6,800	14
Gulf Oil Corp.	Furness S. B. Co.	24,500	560 0	80 0	6,800	14
Halfdan, Ditlev-Simonsen	Furness S. B. Co.	24,500	560 0	80 0	6,800	14
Anders Jahre	Furness S. B. Co.	24,500	560 0	80 0	6,800	14
Sigurd Herlofson	Harland and Wolff	24,500	—	—	—	—
Fred. Olsen and Co.	Harland and Wolff	24,400	580 0	78 0	7,500	14½
Martin Mosvold	Harland and Wolff	24,000	—	—	—	—
Lorentzen's Rederi	Harland and Wolff	24,000	—	—	—	—
Hilmar Reksten	Swan, Hunter and Wigham Richardson	26,000	590 0	80 0	7,200	14
Leif Hoegh	Sir James Laing and Sons.	22,850	565 0	75 0	6,800	14
Leif Hoegh	Sir James Laing and Sons.	23,000	565 0	75 0	6,800	14
P. Meyer	Kockums Mek. Verk.	24,400	570 0	77 0	7,000	14
Sigurd Herlofson	Kockums Mek. Verk.	24,400	570 0	77 0	7,000	14
Sigurd Herlofson	Kockums Mek. Verk.	24,400	570 0	77 0	7,000	14
Hans Torgersen and Co.	Kockums Mek. Verk.	24,400	570 0	77 0	7,000	14
Olsen and Ugelstad	Eriksbergs Mek. Verk.	24,400	570 0	77 0	7,000	14
Ludvig G. Braathen	Eriksbergs Mek. Verk.	24,400	570 0	70 0	7,000	14
Skibs A/S Lampas	A. B. Gotaverken	23,000	560 0	74 6	8,200	14¾
Rederi A/B Monacus	A. B. Gotaverken	23,000	560 0	74 6	8,200	14¾
Skibs A/S Alse	A. B. Gotaverken	23,000	560 0	74 6	8,200	14¾
Olsen and Ugelstad	John Crown and Sons	23,000	565 0	75 0	6,800	14
Hilmar Reksten	Vickers-Armstrongs	24,500	560 0	80 0	6,800	14
Anglo-Saxon Petroleum Co.	Cammell, Laird and Co.	28,600	610 0	80 6	11,000	15
Anglo-Saxon Petroleum Co.	Harland and Wolff	28,000	610 0	80 6	11,000	15
Anglo-Saxon Petroleum Co.	Swan, Hunter and Wigham Richardson	28,000	610 0	80 6	11,000	15

quality supplied by a well-known maker, and during the first year's service the wear in a radial direction was excessive. At the August 1947 drydocking new rings of varying quality, some supplied by the same maker, were fitted. Generally speaking it has been found that best results are obtained with rings having a Brinell Hardness Figure between 210 and 275. The Brinell Hardness Figure of the cylinder liners in this ship is 200/230.

Much interesting and useful information regarding piston ring wear has been collected in the *Auricula*, but longer service is necessary before this information can be substantiated. It is not too early, however, to ask piston ring manufacturers if they are giving their rings

(Please turn to page 84)

Motor tanker "Esso Nyborg" built by Burmeister & Wain, Copenhagen.

German Use of Hydrogen Peroxide For Producing Marine Power

By CAPTAIN LOGAN McKEE

DURING the latter part of World War Two I was on duty in Washington. When it became evident that Germany was on her last legs, the Navy Department created a "Technical Mission for Europe." Various people, scientists, engineers, and naval officers, who were specialists and leaders in different technical fields were designated to head teams within this technical mission. The objective of the teams was to investigate all of the technical advances made by the Germans in their war effort. Each team had a specific objective known as a target which our intelligence had learned about. I was appointed captain of one of these technical teams, and my target was a submarine engine which could be operated in a submerged submarine. It burned fuel like any surface ship engine and obtained the required oxygen for combustion by breaking down hydrogen peroxide into steam and free oxygen. The Germans were known to have operated several submarines with this very astounding engine, which had no counterpart in the United States.

Professor Walter of Walter Werke, Kiel, was a very staunch and perhaps the most able of all the Nazi technical people. He was not personally pre-eminently qualified as an engineer or an inventor, but he was a wonderful organizer and was able to recognize and to attract people of outstanding ability. As I judged him he was, at heart, an arrogant Nazi of the worst type but he was most cooperative. That came about due to the clever manner in which the British handled him. I got the story from a British navy captain who had the same target as mine and who came into Kiel, looking for Dr. Walter, with the British army when they captured the area. Walter was very arrogant and uncooperative at the time. He was immediately put in an airplane and flown to an airfield about 20 miles outside of London. He was then driven over a very carefully planned route through the country-side and through London where no war damage could be seen. Until then he had thought that London was totally destroyed. The British captain, who told me the story, was in the car with him. He told me that he could see Walter deflate and take on a pasty color. When they reached the Admiralty, Walter was conditioned to tell everything he knew, and did.

And now a word about hydrogen peroxide. The value of this chemical lies in its ability to furnish large amounts of heat reliably and conveniently at the places it is required. The formula for hydrogen peroxide is H_2O_2 and

Capt. Logan McKee

the material we will deal with is further defined by giving the per cent concentration, i.e., it is normally manufactured at about 27 per cent concentration. If a higher concentration is required, it is distilled under low absolute pressure, starting at about 50mm Hg and decreasing the pressure to about 30 mm as the concentration is increased to 85 per cent. When used as a disinfectant, the concentration is about 3 per cent, the remaining 97 per cent being water.

The Germans used a concentration of 80 to 85 per cent for 26 different war weapons and had it in an experimental stage for 40-odd others. They gave it a cover name of "Ingolin". Professor Walter, who was the foremost proponent of its use in Germany, named it after his eldest son, Ingol. It is also known there as "T-stoff."

It was sometimes used as a monofuel or primary fuel, i.e., using only the heat of dissociation of the H_2O_2 into H_2O plus 02. The heat of dissociation for 80 per cent concentration is roughly 1000 Btu per lb. The mixture, in that case, would be 80 per cent H_2O vapor (superheated steam) and 20 per cent O_2 by volume (63 per cent H_2O and 37 per cent O_2 by weight), and the mixture would be at 500 C (932 F), assuming that the

This talk was delivered by Capt. McKee before the Seattle Section of the Society of Naval Architects and Marine Engineers in December, and also at the Mare Island meeting in October.

liquid was supplied at 70 F. It was, however, used more often as a secondary fuel, i.e., all or nearly all of the free oxygen was further burned with a fuel, such as decalene (which is similar to Diesel oil) or methyl alcohol. The reaction would, in some applications, take place all in one step by the use of a liquid catalyst and fuel combined. The Germans named the liquid catalyst and fuel mixture they used "Helmann" after Walter's second son. Their mixture was hydrazine hydrate and methyl alcohol. The reasons for using the material as a secondary fuel is to take advantage of the larger heat release per pound of mixture and also because the dollars and cents cost per Btu obtained from fuel is much less for that than from H_2O_2.

It will be noted from the foregoing that the heat of dissociation of H_2O_2 per pound is about 1/19 of that of the heat of combustion of a pound of oil. The value of H_2O_2 is therefore its ability to furnish free O_2 when and where you want it. It has advantages over liquid or gaseous oxygen in that it is more easily contained and it produces a lower flame temperature.

Prior to and during this war, H_2O_2 in this country was not concentrated for commercial or military purposes at greater than 50 per cent, although some laboratory tests had taken it higher. The reason it had not been taken to higher concentrations is that, unless certain rules are known and carefully observed, it is violently unstable and, naturally, the danger increases with the concentration. It follows that the Germans were far more advanced in the subject than any other country. We have been interested in it in this country for years, but did not reach the point of taking advantage of its characteristics in the higher concentrations. We now can and do concentrate it commercially to a higher percentage than the Germans ever did and to a greater degree of purity. For example, the Buffalo Electro-Chemical Company will supply it at 90 per cent concentration with only 5 parts per million impurities. Du Pont can do about the same. The Germans usually had much greater amounts of impurities, some of them not very harmful.

The foregoing will give an idea of the order of the concentrations used.

In the concentration used by the Germans, the specific gravity is 1.37 at 32 F. It is colorless or slightly yellow and has a distinctive, but not unpleasant, odor. The 100 per cent concentration freezes at 20 F, and boils at 306 F at atmospheric pressure, and its specific gravity at 32 F is 1.46 plus. A peculiar thing is that 80 per cent H_2O_2 freezes at 11F and, of course, 1 per cent at just under 32 F; 60 per cent solution freezes at -70 F. The boiling point at atmospheric pressure has to be obtained by extrapolation as the material detonates before reaching the boiling point. Concentration is determined usually by taking its specific gravity, although titration gives a more accurate check. Impurity in the form of sulphuric acid throws off the determination of concentration by observations of the specific gravity and this gave the Germans so much trouble that they learned to eliminate the H_2SO_4.

After a stabilizer (or stabilizers) (the Germans used oxaquiniline or phosphoric acid) is added, it can be left in an open container without too rapid a loss in concentration. Concentration drops off rapidly at first and becomes progressively slower as time goes on, provided no unusual conditions are encountered, and provided further that the heat of decomposition is allowed to dissipate. The drop during the first month in storage is about equal to the drop to be expected for the remainder of the year. It is roughly 1½ per cent the first month and 3 per cent the first year and very little thereafter, but may be much less.

Provided one's hands are clean, they can be put into a high concentration of H_2O_2 without any immediate sensation except a slight prickling. In less than one hour, however, the hands will look as though whitewash had dried on them. When that coating wears off, the skin will be bleached white. All except a few materials act as catalysts for H_2O_2, so if there is dirt under the fingernails or on the hands, a burn will result. The antidote is water, and the way it acts is to reduce the concentration quickly.

With regard to materials used for handling and storage, iron and copper must be carefully avoided as they are catalysts. Stainless steel, 99.6 per cent pure aluminum, glass, ceramics, and certain synthetics can be used; the most widely used synthetic in Germany being polyvinyl chloride, which looks like rubber in its usual form, although it is also available as a cloth. It is used as a packing material for valve stems and for gaskets but it has one serious deficiency in that it shrinks and hardens with age. It is therefore difficult to keep the systems tight when using it. It is understood that Du Pont has a much superior synthetic for the purpose.

When the Germans first started handling and storing concentrated H_2O_2, they used many precautions which they later determined from experience to be unnecessary. The requirements which are essential are carefully observed. They have no more fear of handling it than they have for handling gasoline, for example.

In storage the first indication of instability of H_2O_2 is a rise in temperature. If something isn't done about it, the concentration becomes progressively worse, finally reaching the danger point when the temperature registers 140 F. At that time, the H_2O_2 is dumped into water. In the early storages, there were cooling coils in the tanks and a sprinkling system above them, but experience showed that they were unnecessary. On noting a rise in temperature, more stabilizer is added.

By far the most fundamental rule in handling concentrated H_2O_2 is to have fresh water instantly available for diluting any spilled H_2O_2. Almost without exception, when concentrated H_2O_2 is spilled, a fire starts. All that is needed to put it out is to reduce the concentration below 78 per cent, provided, of course, that no large amounts of combustibles are in the area. The reason that the fire starts so readily is that there are usually some small amounts of combustibles present, such as grease, paint, wood, or cloth on which the H_2O_2 spills; the dirt on the combustible materials acts as a catalyst; heat of dissociation of the H_2O_2 raises the temperature of the combustibles to their ignition point, and the free O_2 is available to maintain the combustion. A little dilution of the H_2O_2 keeps the heat of dissociation below the autoignition temperature of the combustibles. The Germans kept water in the bilges of the engine rooms of their

H_2O_2 driven submarines to reduce the concentration of any spilled H_2O_2.

The men who handle concentrated H_2O_2 wear scrupulously clean polyvinyl-chloride coveralls (which don't look much different from any other kind of coveralls), boots and gloves of the same material, except that the latter are in the form of synthetic rubber.

Laboratory demonstrations of the properties of concentrated H_2O_2 are quite impressive, two in particular. In the first a clean piece of wood has one end submerged in an open container of H_2O_2. No reaction takes place when it is withdrawn. Another piece of similar wood is rolled on the floor and then dipped in the H_2O_2. It catches fire upon being withdrawn. The dirt it picks up from the floor contains materials which are catalytic. In the other demonstration, a small amount of liquid catalyst (hydrazine hydrate) is put in a large flat pan. Then the chemist stands off as far as possible and throws about 2 oz. of H_2O_2 from a beaker into the pan. Only a small part of it actully gets in the pan, but what actually arrives reacts with a loud noise and eruption of sparks. In other words, the decomposition of H_2O_2 in the presence of a catalyst is very violent. In fact, it is a more powerful explosive than TNT, if properly combined with catalyst and fuel; that is, it contains more releasible energy per pound. The material mixes in all proportions with alcohol and with glycerine. It is many times more dangerous to have around than dynamite or TNT, as it is much more unstable.

The Germans used H_2O_2 to launch V-1 bombs, to drive fuel pumps in the V-2 bombs, to drive torpedoes, ME163 and 262 airplanes, and submarines.

For the V-1 and V-2 bombs only the heat of dissociation was used. It was a rather expensive use of energy but was so positive in action that its simplicity and reliability were worth the cost.

Airplanes: The performance of the airplane was astounding. The thrust from the rocket engine corresponded to that of a 3700-hp coventional-type engine, and it weighed about 250 lb. It was not subject to the explosion danger to nearly the extent of the torpedo engine, although the same principle of H_2O_2 in combination with catlyst and fuel was used. The working fluid was not put through a turbine in this case, however, so power was obtained entirely by jet action. It could be cut on and off instantly.

It was related to the author by a German that a woman made the first test flight in the plane. The fuel supply lasted only a very few minutes but thrust was so great that the plane could not be flown in level flight, with the engine on, for more than a few seconds. It very quickly approached the speed of sound. It could climb to 30,000 ft. in 2 minutes, which made it extremely valuable as an intercepter plane. The first planes, the ones which saw war service, had only a main jet so the engine was either full-out or dead. A later design incorporated a cruising jet, in addition to the main, which increased the time that the engine could be kept on about twenty-fold. Its rate of climb and speed in level flight, under cruising-jet conditions were not much better than that of an orthodox gasoline-engined fighter plane, and its radius of action much less; but, until the fuel was exhausted, it had a tremendous reserve of power.

Torpedo Drive: The torpedo drive was somewhat similar to the submarine drive. In the former, a liquid catalyst and fuel combined (Helmann) were used. After 2 or 3 sec, decalene was admitted and the Helmann shut off. Decomposition of H_2O_2 was then accomplished by heat. Temperature in the combustion chamber must remain above 1800 F. The catalyst chamber and combustion chamber were combined. That resulted in a rather dangerous situation, as the arrival of the three liquids had to be accurately co-ordinated. If any was off-time a serious explosion resulted, and our information indicates that about one out of each 100 torpedos was wrecked that way. The performance characteristics were much superior to those of any other torpedo and they were essentially wakeless.

In 1943 the Germans realized that our antisubmarine forces had won against the type 7C submarine which they had depended on up to that time. The 7C was fundamentally much like the ones we used in characteristics, except that it was considerably smaller so that its speed and endurance were less. It displaced about 700 tons on the surface, had a surface speed of 17 knots and a submerged speed of about 7.5 knots. The Germans were able to change their thinking radically in regard to submarines. They realized that, in order to cope with our antisubmarine forces, they would have to go to a true submarine, instead of a surface ship which could be submerged, and that, to make an attack and then escape, it would be necessary to have high underwater speed. Their first and most important development was the underwater breathing tube or "Schnorchel". They used this against us effectively. It permitted them to make a war patrol without once coming to the surface. It was essentially a pipe, which extended 18 in. or so above the surface, through which they obtained air for the Diesel engines and for ventilation.

Then, in the summer of 1943, they conscripted a group of eminent designers and technicians and assembled them in a little town in the Harz mountains. They produced the much discussed type 21 boat. It was a completely different submarine. It would have been very effective against us had the Germans not made one fatal error in their design, as they have done so often. Their hydraulic system was so complicated that they couldn't get it to work before the war ended, although they had built about 120 of these boats by that time. Type 21 had a surface displacement of 1600 tons, a surface speed of 15.5 knots and a submerged speed of 16.5 knots for one hour. It obtained its high underwater speed by the use of large battery power and a battery with very thin grids: 0.160 in. thick.

At this time Walter, at Kiel, was able to speed up the acceptance of his hydrogen-peroxide submarine. He had experimented on the use of hydrogen-peroxide since 1935 and had built and operated an 80-ton experimental H_2O_2 submarine before the war. It performed in accordance with his design and realized some 25 to 26 knots submerged speed. During the war, he supervised the design of four school boats, the first of which went into operation in the fall of 1943. They were known as type 17 and performed in accordance with expectations. They were followed by five operational boats, type 17B. These were 380-ton surface-displacement vessels, surface speed 8.5 knots, submerged speed 25 knots, and had two bow torpedo tubes and two spare torpedoes. They never had a

war patrol because there was never enough hydrogen-peroxide to permit them to so operate.

The last word in submarine design was to have been the type 26 Walter boat. It was under construction when the war ended. It was to have been of 900 tons surface displacement, 11 knots surface speed and 24 knots submerged speed. It had 10 torpedo tubes but no spare torpedoes. The hydrogen-peroxide engine (it had only one shaft) was rated at 7500 hp. Our bombing force never permitted the Germans to get the engine assembled. However, I collected together all the parts for one engine in the summer of 1945 and shipped them to England, where the engine now is.

There is a so-called triple feed pump which pumps H_2O_2 Diesel oil, and water. The Ingolin pump parts, piping, and catalyst chamber are stainless steel. The first position on the starting wheel allows only Ingolin to be pumped. Ingolin reaches the catalyst chamber where it sprays on porous porcelain stones on which are fixed calcium, potassium, or sodium permanganate. As mentioned before, the Ingolin breaks up into steam and O_2, 80 per cent steam by volume, at a temperature of about 930 F. From that point on, materials are simple alloy steels. The steam and O_2 mixture go to the combustion chamber. Soon after it reaches that point, the cooling water is admitted, decalene is allowed to spray into the combustion chamber.

The temperature in the combustion chamber is above the auto-ignition point, but an automobile spark plug in the combustion chamber is energized to assure ignition. Danger of explosion exists in the event ignition fails. A proportioning device admits water, Ingolin, and decalene in a ratio of approximately 12 to 9 to 1. The proportioning device gave more trouble than any other item in the machinery plant. The earlier ones were installed on the triple-feed pump suctions and the later ones on the discharges. There is more hazard connected with those on the discharge side because when the flow of Ingolin is restrained a pressure is imposed upon it and it is churned in the Ingolin pump.

Flame temperature in the combustion chamber is about 4000 F. The water is sprayed into the combustion chamber in an amount to reduce the temperature to the desired degree. The Germans used approximately 1020 F for their turbine working fluid. Working fluid is now about 94 per cent steam by volume and 85 per cent by weight. It goes through what amounts to a conventional steam turbine, operating at 14,000 rpm, and into a contact-type condenser where the steam is condensed.

In the earlier engines, the noncondensing gases were forced overboard by the turbine back pressure but in the engine for the type 26 boat, they were pumped overboard by a Lysholm-type positive-displacement rotary compressor. The spray water for the contact condenser is cooled by circulation through a surface-type heat-transfer unit located outside the pressure hull; sea water is forced through the heat-transfer unit by scoop action.

In Walter Werke, Kiel, in a building was a submarine hull with the wreckage of an H_2O_2 engine in it. The purpose of this installation was for training crews and for test purposes. In the same building I saw parts of a more powerful and more modern H_2O_2 submarine engine. I discussed this new engine with Dr. Walter who told me that it was the last word in such an engine, and had been due for completion in November, 1944, but the Allied bombing had prevented its completion. I obtained all purchase orders pertaining to this engine from Dr. Walter.

I decided to go through Germany and get the missing parts for this modern H_2O_2 engine if possible. With that in mind, my interpreter and I went to Paris to inform Naval Technical Mission, Europe, of my plans and itinerary and to obtain the necessary clearances for entering into various zones of occupation. My interpreter, our jeep and I went by plane to Frankfort. In the next sixteen days we drove the jeep 4,000 miles and visited almost every major city in Germany within the British, French and American zones.

Originally my itinerary did not call for any visit to Heidelberg, but before I had finished the sixteen days I had gone there five times. In regard to Heidelberg, the Germans felt that the British and Americans had such gentlemanly reactions that they would not bomb any educational center. They, therefore, moved a great many of their industrial administrative headquarters into Heidelberg. Their estimate of us proved to be entirely sound as we never made any attack on Heidelberg, and the city remained completely intact except for all bridges across the Neckar River which the Germans themselves blew up during their retreat.

The way this job worked out was, for example: The first factory I went to was Bach and Roiter in Frankenthal in the French zone. I showed them the plan of the part I wanted and found them very familiar with it. It happened to be a turbine wheel with blades. They told me that they had the wheel completed but were prevented from making the blades due to the lack of V-3 alloy, and the only person in Germany known to have this material in stock was a Robert Zebb in Dusseldorf. I then put Robert Zebb on my itinerary, started after my next part, intending to stop at Dusseldorf when I got in the area. The next stop as well as all subsequent ones developed in much the same manner. The factory would be missing some of the parts and I would have to obtain them somewhere else so my list of places kept growing and in many cases repeating places I had been previously.

One of my most difficult tasks was to obtain 10 tons of semi-hard coal in Czechoslovakia. This submarine engine decomposed H_2O_2 by running it through a catalyst of potassium chromate. This chromate was fixed on porcelain stone which had to be very porous and at the same time quite strong. I found that the man who invented the process lived in a place called Marktredwitz near the Czechoslovakian border, so I went to see him. He told me that there was no such stone available in the world, but that he could make me the quantity I wanted if I could get him 10 tons of a certain kind of Czechoslovakian coal which he needed for the process. I went to Pilsen, Czechoslovakia for the coal and contacted the military governor, a U. S. Army general. He informed me that the feeling between the Czechs and the Germans was very bitter and that the Czechs would not permit any of their coal to go into Germany. I explained to the general that this coal was important for my purposes and would not be used for German purposes and asked him whom I could contact who could grant authority to obtain the coal and to transport it to Germany. He gave me the

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Refraction and Mirage

By WILLIS EDWIN HURD

U. S. Weather Bureau

VISIBILITY AT SEA is a matter of interest and importance to all navigators. Lack of visibility is a matter often requiring precautionary measures on the part of the ship's navigators and is the result of various causes. Fog perhaps is the most important, as it is the most generally prevalent and obscuring of all year-round thick-weather phenomena. Haze and storms contribute their quota to navigational menaces, and atmospheric refraction and mirage, which are more prevalent at sea than superficial thought on the subject might suggest, come to add their ofttimes disturbing factors to the hazards of the mariner.

This article concerns the phenomena of terrestrial refraction, both in respect to the exceptional visibility sometimes induced by it—with its deceptive and therefore dangerous possibilities—and to mirage, with its various optical distortions, which present an uncertain or topsy-turvy world to the eye of the observer.

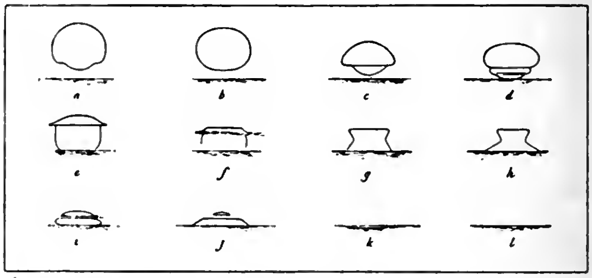
Atmospheric refraction is the bending of light rays passing through the air from a straight course. It is due to differences in density. If the atmosphere throughout its depth had exactly the same density, the rays of the sun after entering it would proceed in straight lines to the earth, but as the density increases toward the surface, any rays not vertical are constantly though slightly deflected; that is, refracted from a straight line throughout their downward passage. If this density increase were regular, the refraction would be regular, but as, especially near the earth's surface, the air undergoes irregular and often sharp changes in density, light rays passing through such differing layers are therefore refracted more or less irregularly. Viewed from a point on the surface, the amount of refraction increases from the zenith toward the horizon.

Though atmospheric refraction is at all times present, it commonly is wholly unapparent to the eye, because as a rule there is nothing unusual about it. Nevertheless, it has to be reckoned with in all calculations involving mathematical accuracy in the determination of altitudes and positions, whether astronomical or navigational.

Astronomically, it was known centuries ago to exist. It is shown by the twinkling of the stars, and by the fact that the sun and moon rising and setting appear above the horizon in the one case and still remain above it in the other case, so far as the eye is concerned, while these bodies themselves are geometrically below the horizon. This result of terrestrial refraction, whereby the curvature of light rays in the atmosphere appears to raise objects to a higher level than is actually theirs, is of course an optical illusion. But it occurs moderately at all times except when the atmospheric density is less at the surface, owing to considerable heating of the surface air, than above it. Under such abnormal conditions abnormal refraction occurs, and observers may at times witness what appear to be extraordinary plunges at the rising or setting of the principal luminaries.

Wherever in the atmosphere layers of air of distinctly varying temperatures, humidities, and densities exist alongside of, or superimposed upon, each other, or wherever tongues or layers of air of differing densities are in the process of mixing—which induces more or less streakiness—the atmospheric medium is disturbed. These conditions induce the irregular changes in light refraction which have already been alluded to, and during the occurrence of which, manifestations of various peculiar sorts occur. The nature of these irregularities is well indicated in the following quotation from the Weather Bureau's "Instructions to Marine Meteorological Observers", Fifth Edition, 1929.

"It is well known that the atmosphere, generally, is so stratified that with increase of elevation many more or less abrupt changes occur in temperature, composition, density, and therefore, refrangibility. As each layer glides over each other, billows are formed, and the adjacent layers thereby corrugated. The several layers frequently also heat inequally, largely because of disproportionate vapor contents, and thereby develop, both day and night, and at various levels, innumerable vertical convections; each moving mass differing, of course, in density from the surrounding air, and the changing velocity being drawn out into dissolving filaments. Optically, therefore, the atmosphere is so heterogeneous that a sufficiently bright star shining through it would produce on the earth a somewhat streaky pattern of light and shade."



From a sketch by Dr. Arctowski, the above shows the successive stages of a solar distortion witnessed during an Antarctic sunset. Note the double refractions, the flattenings, and the hour-glass shapes, which so frequently accompany such a phenomenon.

The effect observed on looking through an atmosphere

Illustrations for this article are taken from drawings prepared by the U. S. Hydrographic Office.

that is confused by reason of a mixture of air masses of unequal temperature and different moisture content is crudely like that noticed on gazing through a piece of roughened window glass, that is, a blurring of any object seen through it. The heterogeneity in the atmosphere also produces optical haze, appearing much like real haze or fog, which may be light or dense, depending upon the character and intensity of the disturbing influences.

An appearance on the horizon of a dense haze bank—most frequently along the shore—not due to motes or moisture particles, results from greatly disturbed atmospheric refraction, and is often accompanied by well-marked mirage.

Temperature inversion and its effects on refraction.—Since the subject of temperature inversion in connection with its relationship to refraction phenomena will here and there be alluded to in the course of this article it may be discussed briefly.

There is on the average a fall in temperature with increase in altitude. However, owing to various causes, temperature changes from the earth outward are by no means of a regular nature, and often there is locally an increase in temperature for a short distance with altitude. This condition is called a temperature inversion.

A simple example of one manner in which such an inversion may be induced is seen in the blowing of a warm wind over a much colder surface. The surface air layer becomes chilled by contact, and therefore becomes cooler than the overlying layer of warm air. An abnormal density difference is thus introduced, and with it an abnormal bending of light rays which may result in local peculiarities in refraction noticeable as a mirage.

Abnormal visibility due to refraction.—Abnormal visibility is the result of more than normal refraction, and may or may not be accompanied by a recognizable mirage. Regardless of how free of vapor and other particles the air may be, the extent of normal visibility at sea is limited to a certain few miles from any given point at ocean level to the horizon, but increases with elevation of eye or object and of course varies slightly with latitude. These distances are scaled in visibility tables, which take ordinary refraction into account in navigation, and it is certain that any longer range of visibility than that recognized for ordinary refraction is the result of abnormal refraction.

For instance, if, from the deck elevation of a steamship (say 40 feet), an object at sea level under ordinary conditions may be seen at a distance of 7.27 miles, an abnormal condition is existent if the object becomes visible at a distance of 15 or 20 miles. If the elevation of the object is 100 feet, with the viewing elevation remaining stationary, according to the tables 11.5 miles are to be added to the 7.27 miles, which equals almost 19 miles, the extreme extent of normal visibility at the elevations given. In this case a visibility of 20 miles or over is abnormal. What is normally a visibility of 19 or 20 miles may by abnormal refraction be increased to double that distance, or more, and when this happens the ship's apparent position may be so altered as to seem to be a number of miles off her course.

Types of Abnormal Refraction—Mirage

Origin of term mirage.—When refraction is so pronouncedly irregular as to distort, transpose, or otherwise change the appearance of objects presented to the eye, the induced phenomenon is called *mirage.* The word is of French derivation—"look at", or see one's self in a mirror—and was first applied by the mathematician Monge in an account of the phenomenon, published in 1800, describing a mirage witnessed during the Napoleonic expedition into Egypt in 1798.

Mirage terminology.—Certain terms are applied to the varying phases of terrestrial refraction that are noticeable as mirage. The most commonly observed types of the phenomena, both on land and sea, are those known as "looming" and as "superior" and "inferior mirage." Various combinations of these refraction forms, which result in strange distortions, are also comparatively frequent, and a few less commonly known types, such as "sinking", the opposite of "looming", and "lateral mirage", occur.

Looming is the apparent raising of an object abnormally above the horizon. It is quite common at sea, especially in middle and high latitudes, and results in the appearance of distant objects which may in many instances be actually below the normal horizon at time of observation. It is of two types. In one case the object—which may be a distant land or ship—is seemingly increased in elevation though not in size; in the other case the object appears to be enlarged and brought much nearer to the point of observation.

The atmospheric condition which produces this phenomenon is one in which there is an abnormal decrease in the density of the air from the surface upward, and a greater than normal curvature surfaceward of the paths of light rays. The more rapidly the density decreases with elevation, the more unnatural and impressive becomes the phenomenon. If the rate of this decrease is variable at low elevations, the shape of the looming object is distorted and strange bulgings, thinnings, flattenings, or pointings may occur. Thus, a distant rounded island peak might loom in its natural shape, appear with a perfectly flat summit, or with a misshapen summit drawn much nearer the observer than its base.

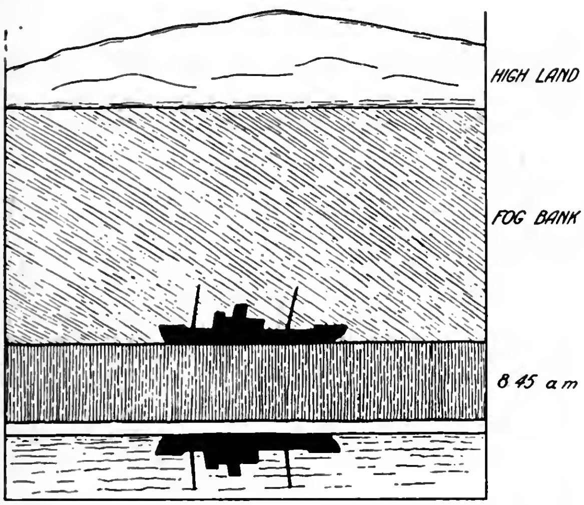
Sinking is a form of refraction, opposed to looming, in which the curvature of the light rays may be abnormally lessened. with the consequence that an object which at the normal distance of vision should be seen above the horizon is so depressed optically as not to be observed.

Superior mirage.—When *apparent reflection* from a more or less mirrorlike atmospheric layer occurs at some overhead point, so that an object is seen as though inverted above but touching or nearly touching its real self, we have an instance of *superior mirage.*

Superior mirage is due to an atmospheric condition wherein there is a pronounced temperature inversion at a distance of several feet above the surface. This inversion introduces an abnormal change in density, and more or less extraordinary refraction results. At sea, during the occurance of this condition, a ship may appear normally on the surface of the sea, while its image shows upside down, with masts or funnels of the real and unreal images at or near contact.

All sorts of complications may occur in connection with a mirage of this character. The ship may be so far distant as not to be visible above the normal horizon, yet

refraction may raise it into partial visibility. Then along the line of sharpest density change above it there may appear an inverted image of the ship and above that another image, upright, with hull at the water line touching the inverted image except for a narrow intervening layer which indicates the presence of a further line of density discontinuity.



The above figure represents a mirage viewed from the British S. S. "Uffington Court" while 14 miles west of the Golden Gate, San Francisco, March 26, 1930, as described in the Marine Observer, of the London Meteorological Office, for March 1931. The vessel shown was about 4 miles distant. At the top of the figure, high land appears, with a fog bank below it. Then comes the refraction band, resting upon the water, with the ship's mirages seen in inverted and upright positions. This was the condition at 8:45 a.m. Two minutes later the vision had changed again.

In connection with such an exhibit, there may occur almost any sort of irregularity in the air currents—waverings of the boundary lines between the layers of air of differing densities, interweavings of tongues of air from one layer to the other, etc.—until the mirage, instead of being a clear-cut visual wonder, becomes a phantasmagoria of uncouth and slowly changing images, often bearing no resemblance to the refracted object.

Inferior mirage.—Contrary to the condition producing superior mirage is that which causes the image to appear below instead of above the object observed. This occurs only when the surface stratum of air becomes so heated that, through expansion, its density is less than that at a short distance above it. This reversal of normal conditions frequently gives the observer a glimpse of an interesting phenomenon. Supposing he were in a desert under the atmospheric conditions described, he might see an appearance of a body of water in the sand at some distance before him. If the mirage conditions were sufficiently extensive and there were an oasis or a town at not too great a distance beyond the horizon, the observer might see either of these views, apparently situated on the farther shore of the seeming body of water If more complicated conditions occurred at the time, the town or the trees in the oasis might also appear in both erect and inverted positions.

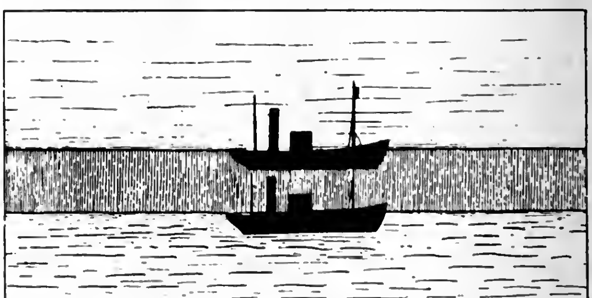
In "superior mirage" the refracted objects here alluded to would have been thrown above the horizon, as though from under surface of a reflecting plane in the free air. In "inferior mirage" they are indicated as thrown down inside the horizon, as viewed from above the reflecting plane, between the eye and the earth's surface.

A commonly seen form of refraction is the simple inferior mirage of the paved road over the rolling land on a still, warm, sunny day. One may look ahead toward the top of a rise, and, as the eye comes just above the level of the high portion of the road, may see what appears to be a pool of water that disappears as the angle of vision again changes. The pool is only the "low sky image" in a very shallow layer of surface air which is much warmer than that immediately overlying it.

Inferior mirage is less frequently observed at sea than on land, since the necessary condition of greatly heated surface air, such as that warmed both by strong insolation and by radiation from a hot land surface, is infrequent over water.

When seen over water, it probably occurs most frequently in straits or other narrow bodies of the sea and along warm coasts. It also appears that, when it does occur, it is more or less associated with superior mirage, since many of the images seen with it are those of the superior type.

Inferior mirage at sea may be distinguished by the presence of a low-lying stratum of air which at a distance is so impenetrable to the vision as to resemble a dense haze or fog bank, for which it is often mistaken. Such an air layer, a few feet in thickness, usually rests on the surface and displaces the horizon. If air currents disturb it, the result is a notched or distorted horizon within the area of the disturbed air. Thus, if a ship is near land on one side, and there are ships lying in different directions and at different distances seaward, very striking mirages may be witnessed. At a distance ships may appear normal, while nearby they may be partly hidden, divided, distorted, or inverted. The coast line itself may be badly jumbled, with heights exaggerated and misshapen, and sometimes with the bases of hills apparently superimposed upon their summits.



In this figure, taken from an article in the Marine Observer of June 1930, entitled "Abnormal Refraction and Mirage at Sea," prepared by H. T. Smith, of the British Meteorological Office, a whaler is shown at two elevations, both upright, with a mock fog bank between. This was witnessed on board the British S. S. "Port Darwin," February 21, 1927, when 20 miles from Table Bay.

Lateral mirage.—Occasionally mirage is observed bordering on the side of a cliff or a steep ridge, whence

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Bethlehem Overhauls Krupp Diesel

By MORRIS WEITZNER
Chief Engineer, Bethlehem Steel Company
Shipbuilding Division, San Francisco Yard

ALTHOUGH overhauling marine diesel engines is an old story for the San Francisco Yard, each represents an individual job to the Marine Engineer, and each requires machine shop personnel with special skill and experience. In the case of an 8-cylinder Krupp diesel, which recently underwent an extensive overhaul here, this was no exception. This particular diesel was from the motorship *G. S. Walden,* a 6,292-ton tanker built in Rotterdam, Holland, in 1935. The vessel is registered in London and operated by the Standard Vacuum Company in the Far East.

This overhaul was unusual in one respect—that it was performed on a Krupp diesel, a type of engine which is found on only one other vessel operating on the Pacific Coast. Another feature which is not generally found on other vessels of this type—all auxiliary machinery is steam operated.

The entire cylinder block in the *Walden's* Krupp was made up of four 10-ton castings, or entablature sections, with two cylinders each.

Drilling angle holes for lube oil pipe leading to cylinder liners in new entabe section. Fourteen angle holes were drilled in this operation.

This photo shows the "Walden" on drydock at the San Francisco Yard where workmen are preparing to remove propeller and tailshaft for classification and inspection.

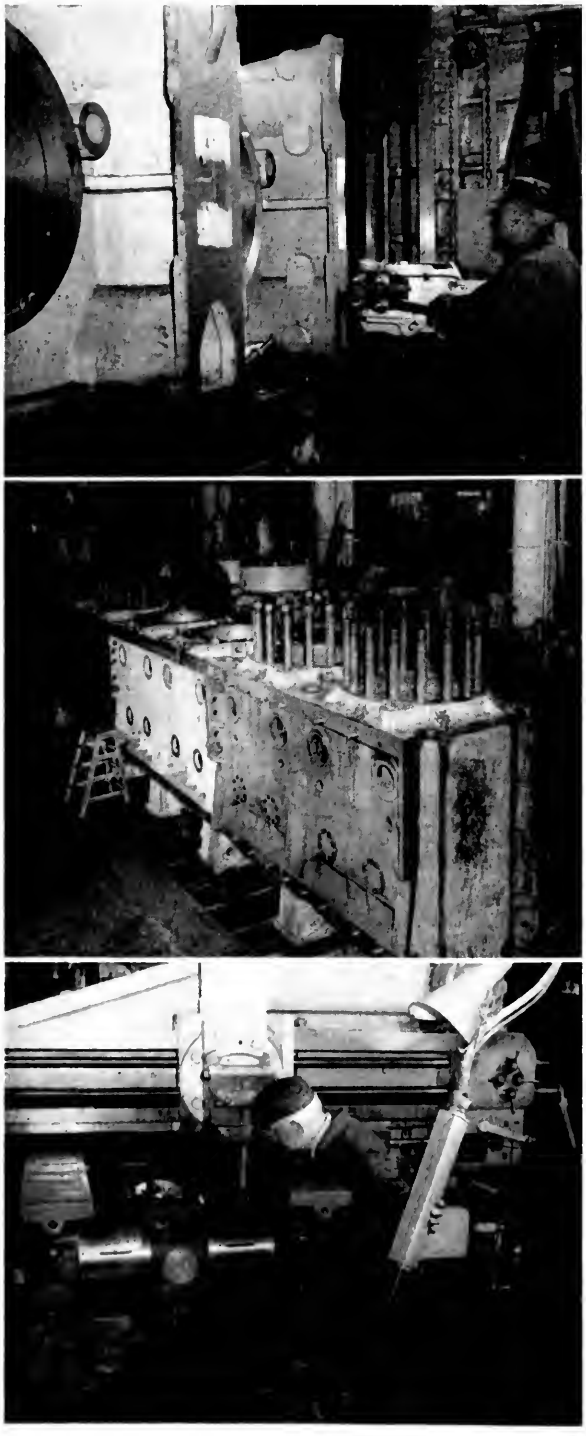
Because of severe corrosion resulting from salt water used in the engine's cooling system, the number 3 forward entablature section had to be completely renewed, a requirement not usually encountered on a job of this nature. Therefore, a complete new rough casting had to be machined to proper specification in the yard's machine shop. The remaining three sections were removed to the shop, where the liners were taken out and the cylinders bored in way of exhaust ports. A ring was then shrunk on in way of the deteriorated or corroded areas. Following this operation the liners were overhauled, new rubber and copper seal rings installed, the contact faces skim cut and reinstalled in the entablature sections, after which the assembly was properly tested.

All crossheads also were removed to the shop where eight stub-ends were renewed and the crosshead journals remachined. Crosshead slippers were planed and all

Top: Planing new entablature section to same exact size as the one it replaces.

Center: Lining up new cylinder block (shown at left in white) for reaming to adjoining blocks.

Bottom: Trueing up one of 32 crosshead slippers for proper alignment.



crosshead bearings, including spares, were remetalled and machined to size. Then the entire unit, consisting of piston rod, crosshead, and pump brackets, was reassembled.

In addition to the extensive amount of work performed in overhauling the *Walden's* diesel engine, a considerable amount of other work was done on the vessel. This included retubing the waste heat boiler, overhauling all auxiliary machinery, and removing and replacing the tailshaft for classification inspection. The vessel was drydocked, her hull cleaned and painted, and all cargo tanks hydrostatically tested and proved tight. Two lifeboats were stowed on temporary cribbing on deck for shipment to the Far East to be used on another ship belonging to the line.

All crew's quarters, heretofore occupied by Chinese, were converted so as to be acceptable to a Laskar crew, which is being flown out from India to man the vessel on her outward voyage. Since religious customs of this Indian crew demand special feeding equipment, a special crew's galley had to be built and installed.

American Bureau—Lloyd's Deal Cancelled

The working agreement between the American Bureau of Shipping and Lloyd's Register of Shipping, which was signed in London on June 8 and approved unanimously by the governing bodies of each Society, and which was publicly announced on July 13 to become effective January 12, 1949, will not be carried out.

Lloyd's Register of Shipping has notified the American Bureau of Shipping that, owing to objections raised by various private interests in Great Britain, it is not prepared to carry out its agreement of June 8.

Accordingly, the American Bureau of Shipping, commencing early in 1949, will be represented in Great Britain and all the principal ports of the world by its own representatives.

The American Bureau of Shipping is a non-profit organization whose membership consists of leading American shipowners, shipbuilders, underwriters, and representatives of the United States Maritime Commission, the Army, the Navy, and the Coast Guard.

Its function is to set standards for the building and physical maintenance of ships. A ship which is built in compliance with the Rules of the Bureau and is maintained in the condition required by the Bureau's Rules is issued a Classification Certificate and is registered in The Record of the American Bureau of Shipping. The Record is published annually, with monthly supplements, and is issued to shipowners, shipbuilders, underwriters, Government officials and others who have an interest, for one reason or another, in knowing the character of a ship and whether it has a current Classification Certificate.

During World War II, the American Bureau classified over 5500 ships which were being built in American shipyards.

Lloyd's Register of Shipping is also engaged in the business of classifying ships and, in general, performs similar functions to those of the American Bureau.

Neither Society writes insurance.

Steamers for Yangtze River

IN THE COURSE of replacing their war losses and in pursuing an extensive rehabilitation program the Ming Sung Industrial Co. of Chungking has just taken delivery of six 168 ft. and two 283 ft. combination passenger and freight vessels of a highly specialized nature for use on Yangtze River. Another of the larger vessels will be delivered in the Spring. Four of the smaller vessels were built by the St. Lawrence Metal and Marine Works, while two of them and the three larger vessels were built by George T. Davie & Sons, both of Quebec. Both designs together with detail plans were prepared by Philip L. Rhodes, Naval Architects and Marine Engineers of New York City.

Navigation on the twisting and unruly Yangtze is difficult at best, and this is particularly true of the Upper Yangtze where the current often reaches 12 m.p.h. and where groundings and sinkings are a common occurrence. Low water conditions exist five months of the year, sometimes falling to a stage of seven or eight feet as against a depth of at least twenty feet during the other seven months. The pilots must have lifelong experience in what, on these waters, has become a fine art.

168 Ft. Motor Vessels

The smaller vessels are 160 ft. L.B.P., 33 ft. beam, with a maximum draft of 8 ft. 6 in. They are twin screw and powered by two 1200 h.p. General Motors Corp. Model 12-278-A Diesel motors, controlled from the wheelhouse. Service speed in full load condition is 14 knots. They have a crew of 53 and carry a total of 130 passengers in three classes.

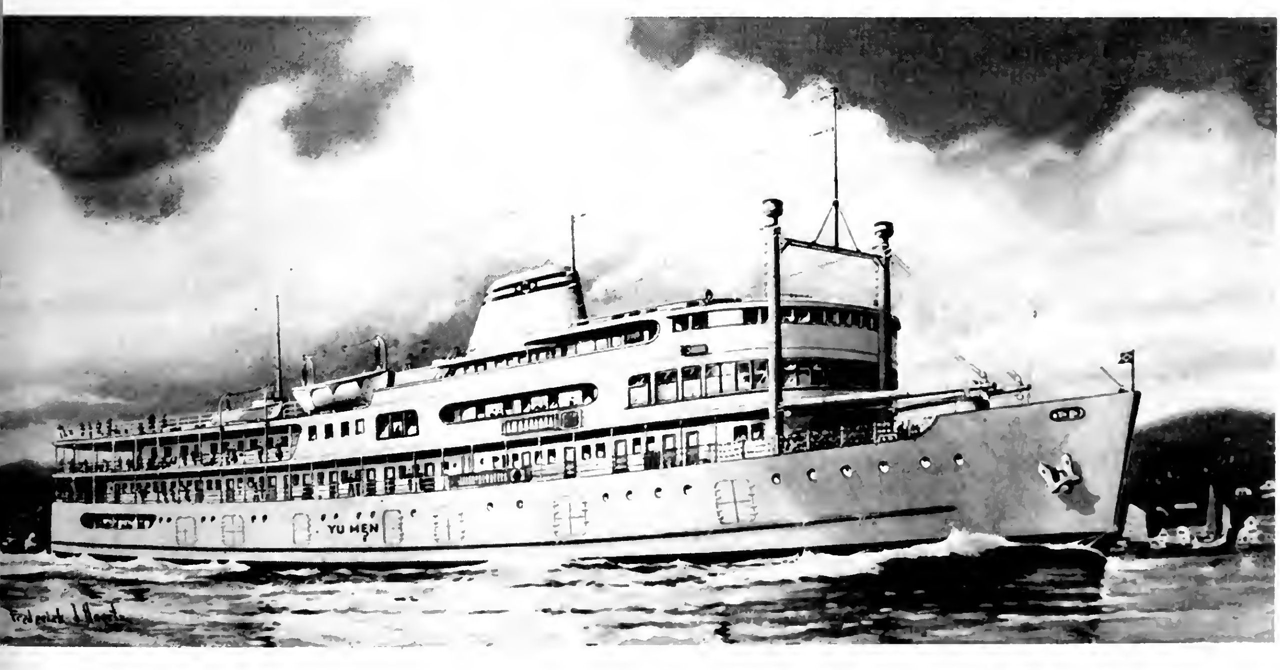
283 Ft. Turbine Steamers

The larger vessels are very similar to the smaller vessels in general appearance and arrangement. They are 270 ft. L.B.P., 50 ft. beam and have a full load draft of 12 ft. On a displacement of 3090 tons they carry 1600 tons Dwt., including both liquid and dry as well as refrigerated cargo. Full load service speed is 14 knots. The crew numbers 83 while there are 262 passengers, including 46 Special Class in winter and summer air-conditioned quarters and their public spaces on the Saloon Deck. There are 56 Second Class and 160 Third Class passengers.

Power Plant Details

It is believed these are the first turbine driven river steamers ever built. The main propulsion machinery consists of two 2500 B.H.P. DeLaval high speed, cross compound, double reduction geared steam turbines driving the propellers through Falk flexible couplings, at 250 r.p.m. Steam at 450 psig and 750° F. is generated by two Foster-Wheeler boilers of the two-drum, bent tube, D-type. Two DeLaval 300 K.W. turbine driven generators supply auxiliary power at 240 Volts D.C. An unusual feature is that the boilers are completely equipped for burning either coal or oil and are readily convertible from one to the other. Combustion control is

283 ft. Yangtze River freight and passenger steamer.



automatic.

All steam reciprocating pumps were supplied by Worthington, electric motor driven centrifugal pumps by Fairbanks-Morse, and rotary pumps by DeLaval. The 100 K.W. emergency generator is by General Motors. The Waterous cargo oil pump is of 1000 g.p.m. capacity and is also available to the bilge system. SKF roller bearings are used in the line shafting and the stern tubes are oil filled and fitted with Syntron seals.

Safety Features

Everything has been done to make these vessels as safe as possible, not only in hull construction, double bottoms and unusual subdivision, but also every system has its standbys and inter-connections. Walter Kidde & Co. smoke detecting and CO_2 fire extinguishing systems, besides steam and water, protect the cargo holds, machinery spaces, ship stores, etc. Two 250 g.p.m. portable fire pumps are included in this equipment.

Ventilation

There are 32 individual mechanical ventilation systems, with pre- and re-heaters, which supply air to passengers and crew's quarters and the holds and 'tween deck dry cargo spaces. Insulation is by Fiberglas.

Deck Machinery and Steering

The deck machinery is electrically driven. The 25 h.p. anchor windlass, two 25 h.p. ten ton cargo winches and the 10 h.p. capstan aft were by the Progressive Engineering Works of Vancouver. The hydro-electric steering gear with 40 h.p. motor and standby are by McLeod and Callander of Irvington, N. J. Half-ton electric trolley hoists carry cargo from the cargo ports to the various corners of the 'tween deck spaces and over to hatches to the holds below.

Unusual and Outstanding Features

As mentioned above, the 283-footers are perhaps the first river vessels ever built with steam turbine propulsion. Also, in regard to power and equipment they undoubtedly set a new record. Again, it is believed that few fast river vessels have ever equalled them in displacement and deadweight carrying capacity.

Broad Use of Aluminum-Alloy

Surely no vessels ever before were built that used aluminum alloy to such an extent. In these vessels the entire superstructure, including the house sides and framing, decks and deck beams, joiner bulkheads, doors, furniture, ladders, rails, stanchions, hatch covers, cargo ports, stack, ventilation ducts, window frames, lifeboats and davits are all of aluminum alloy. Federal Lavoroc is used to cover the aluminum decks.

Maneuverability

Due to the requirement of great maneuverability the vessels are equipped with unusually large rudders, the smaller with twin and the larger with triple rudders. Time for hard-over to hard-over is seven seconds on the smaller and ten seconds on the larger vessels. This results in a tactical turning circle of one and one-half times vessel length.

Innovation of High Tensile Steel

While the hulls of the smaller vessels are electrically welded mild steel the 283 footers are unique in that they are the first vessels, at least commercial vessels, ever to be built of high tensile, corrosion and abrasion resisting steel, i.e., Cor-ten as produced by the United States Steel Corp. This resulted in a weight saving of seven per cent inasmuch as Lloyds permitted a reduction of 10% in all scantlings over ¼ in. thickness. Not only because of the great desirability of saving weight but also because of its superior qualities in practically every shipbuilding requirement, this is an important innovation. The slight extra cost of this higher grade steel is more than offset by increased payload. Also, the greatly increased life, due to less corrosion and abrasion with consequent less maintenance and time in dock, will pay handsome dividends.

They are unquestionably the most modern and up-to-date river vessels ever built. Though intended for sheltered, yet rugged, river service they proved themselves excellent sea-boats while crossing the Atlantic and proceeding on through the Mediterranean and the Suez on their 12000 mile voyage to China.

270′ L.P.B. RIVER FREIGHT AND PASSENGER STEAMERS

EQUIPMENT SUPPLIERS

Item	*Make*	*Supplier*
Boilers	Foster Wheeler	Foster Wheeler, Ltd. St. Catherines, Ontario
Feed Water Regulator	Swartwout	Foster Wheeler, Ltd.
Liquid Level Indicators	Jerguson	Peacock Bros. Ltd. Montreal
Forced Draft Blower / Induced Draft Blower	Canadian Blower & Forge Co.	Foster Wheeler, Ltd.
Combustion Control	General Regulator Co.	Foster Wheeler, Ltd.
Boiler Feed Pumps	Worthington	John Inglis, Ltd., Montreal
Fuel Oil Pumps	Worthington	John Inglis, Ltd.
F.O. Pumps (Standby)	DeLaval (IMO)	DeLaval Steam Turbine Co. Trenton, N. J.
F.O. Heaters	Whitlock Mfg. Co.	Darling Bros.
Main Turbines / Turbo Generators	DeLaval	DeLaval Steam Turbine Co. Trenton, N. J.
Main & Aux. Condensers / Main & Aux. Air Ejectors	Worthington	DeLaval Steam Turbine Co.
Main & Aux. Circulators / Main & Aux. Condensate Pumps	Fairbanks Morse	Canadian Fairbanks Morse & Co. Ltd.—Montreal
L.O. Service Pumps	DeLaval (IMO)	DeLaval Steam Turbine Co.
L.O. Service Pumps (Standby)	Worthington	John Inglis, Ltd.
L.O. Coolers	Whitlock Mfg. Co.	Darling Bros., Ltd. Montreal
L.O. Centrifuge	DeLaval	DeLaval Separator Co. 165 Broadway, N.Y.C.
1st Stage D.C. Heater	Worthington	John Inglis, Ltd.
2nd Stage Feed Heater	Ross Heater & Mfg. Co.	Horton Steel Works Fort Erie North, Ontario
Evaporator & Distiller	W. & J. Weir Ltd.	Peacock Bros.
Emergency Generator	General Motors Corp.	G.M. Company
Fire, Sanitary & F. W. Pumps	Fairbanks Morse	Canadian Fairbanks Morse Company
Air Compressors	Gardner-Denver	Canadian Fairbanks Morse Company
Cargo Pump	Waterous	Canadian Fairbanks Morse Company
Flexible Couplings	Falk Company	DeLaval Steam Turbine Co.
Thrust Bearings	S K F	DeLaval Steam Turbine Co.
Steady Bearings	S K F	Canadian SKF Co., Ltd., Montreal
Stern Tube Bearings	S K F	Canadian SKF Co., Ltd., Montreal
Shaft Couplings	S K F	Canadian SKF Co., Ltd., Montreal
Propellers	Wm. Kennedy & Sons Ltd.	Wm. Kennedy & Sons, Ltd. Owen Sound, Ontario
Shaft Seals	Syntron	Syntron Company, Homer City, Pa.
Gauges & Remote Reading Thermometers	Foxboro Mfg. Co.	Peacock Bros.
Tachometers & Rev. Counters	Electric Tachometer Co.	Electric Tachometer Co. 2218 Vine St., Phila.

(Please turn to page 83)

The Monterey

The Monterey before reconversion started.

Sail again O stately steamer, Monterey.
Days of rescue, days of venture, Monterey,
Remind but of a virile past that should return.
Lead again to trading byways
Plow again Pacific highways
Ships and men are needed, as we never seem to learn,
Monterey.

Sail again and lade our cargo, Monterey.
Lade our armies, keep us ready, Monterey.
Keep our flag prevailing whence our boys have swept
the foe.
Hold secure our Orient freightway
Ply again our Golden Gateway.
Ropes and chains can't keep you idle, you have earned
the right to go, Monterey.

—T. D. M.

Rescue by the United States Troopship Monterey

Depicting the rescue of 1,675 troops from the torpedoed troopship, "Santa Elena", in Mediterranean waters, November 6, 1943.

Picture painted by Lieut. Hunter Wood, USMS.

new Loran

and readability

Now Sperry announces a new *direct-reading* Loran for shipboard use including all the desirable features of the Sperry Mark 1 Lorans in use on many vessels today . . . plus six distinct improvements that provide even simpler, speedier operation and improved readability.

SIGNALS AUTOMATICALLY POSITIONED

The addition of automatic frequency control eliminates drift and *holds* signals on the operating portions of the traces, thus greatly simplifying matching of pulses.

FASTER MATCHING OF SIGNALS

Signals can be matched in a fraction of the time required with other Lorans. One reason is . . . the coarse and fine delays are *continuous*. That is they do not operate in steps and never come up against a stop. Another reason is that these controls are *motor driven* . . . resulting in simpler, faster operation.

NO INTERFERENCE WITH NIGHT VISION

Use of "black light" (ultra-violet) lights up the time-difference meter and station selectors for quick and accurate reading in the dark without interference with night vision. Because the scope face is recessed, signals can be matched in a brightly lighted chart room.

FOR VESSELS WITH D-C POWER

An ON-OFF switch on Loran control panel automatically starts and stops dynamotor, or motor generator, required for ships having d-c power.

TILTABLE CONTROL PANEL

The receiver-indicator is well protected in a sturdy cast aluminum case mounted on trunnions which permit tilting the unit to any desired angle.

BACKED BY SPERRY SERVICE

The new Sperry Mark 2 Loran is backed by the Sperry world-wide service organization. Write Marine Department for information.

OPTIONAL MOUNTING

The new Mark 2 Loran, because of its compactness, trunnion mounting and separate power supply, permits four different mounting arrangements, depending on the space available in your vessel.

DECK MOUNTING

BULKHEAD MOUNTING

OVERHEAD MOUNTING

SPERRY GYROSCOPE COMPANY

DIVISION OF THE SPERRY CORPORATION • GREAT NECK, N. Y.

NEW YORK • CLEVELAND • NEW ORLEANS • LOS ANGELES • SAN FRANCISCO • SEATTLE

Marine Insurance

Claude V. Smith

MARINE INSURANCE—What?—Why?

By CLAUDE V. SMITH
of Walker & Company

THE NEED for an understanding of the basic principles of Marine Insurance is of prime importance to Exporters, Importers and Foreign Traders of this area. A new industrial empire is being formed in our Pacific Southwest, and the Pacific Coast of the United States is the last frontier for this development.

The contract for "sea insurance" is a primitive one and it can rightfully be said "born in antiquity and lost in obscurity." As far back as 800 B. C. we learn from history that the merchants and traders of Phoenicia and the island of Rhodes carried on a practice in their maritime ventures which bore out some of the features of marine insurance as we know it today.

A marine insurance policy was a well-known document long before the first fire insurance policy was ever written. Although today the fire insurance business is of greater consequence from the standpoint of premium income and most general insurance companies write both fire and marine insurance, there is absolutely no relation between the two types. In many points there is just as great a difference between fire insurance and marine insurance as there is between life insurance and any other form.

Marine insurance is a contract whereby one party, for a stated consideration or "as agreed" pledges to indemnify another interested party against loss to property exposed to marine perils. The law of marine insurance originated in the common law for the benefit of international merchants and certain principals are universally established and adherred to which are prevalent over the entire world.

The present day Marine Insurance contract protects the assured from loss by General Average which is the root of marine insurance and that portion of the present day policy known to the merchant of ancient times. General Average applies only to maritime ventures. It is such an ancient law that it can well be argued today that it is entirely outmoded. Of all the cumbersome, burdensome, antiquated, expensive methods of doing business, General Average takes first place. A number of years ago, a very able marine underwriter lived in San Francisco. He wrote a most interesting article against the continuation of General Average, and it caused world wide comment. It was published in 1915 and the opening sentence of that treatise began:

> "In view of the completion of the Panama Canal—the masterpiece of human construction help to the Maritime Commerce of the world, I deem it an auspicious moment to propose the abolishment of General Average."

When I refer to General Average being cumbersome, burdensome and expensive, you may understand what I mean when I tell you that the usual General Average takes approximately three years to complete and is finally published in book form. It is a bound volume and of varying size depending on the size of the cargo and the interests involved, but often as large when open, as an 18 x 24 inch desk blotter and when closed as much as three inches thick. There have been instances on our Pacific Coast where a General Average has taken six or seven years to finally complete.

Assuming that most of you men have heard the term General Average, but that you do not realize the meaning, let me give you a few brief highlights. General Average is probably best defined in a famous case of the United States Supreme Court involving the vessel *Star of Hope* wherein the Court sitting in Admiralty stated:

> "General Average contribution is a contribution by all the parties in a maritime venture to make good the loss sustained by one of their number on account of voluntary sacrifices made of part of the ship or cargo to save the residue and the lives of those on board from an impending peril or for extraordinary expenses necessarily incurred by one or more of the parties for the general benefit of all the interests embarked in the enterprise."

Let us note the requisites of General Average in the quotation I have just given:

(a) It must be voluntary
(b) It must be due to an imminent and overwhelming peril
(c) It must be made by the Master or by his authority

This paper is based on a talk given by Mr. Smith before the Junior Foreign Trade Association of Southern California in November.

(d) It must be successful

The name of Lloyd's is synonomous with Marine Insurance and although Edward Lloyd was not an underwriter, but the owner of a London coffee house, the name Lloyd's is traceable directly to this man. He encouraged foreign traders and ship owners to meet at his establishment. The Marine Underwriters of today and the men who frequented Lloyd's coffee house from 1680 to about 1720 still have one thing in common beside insurance—they still like to get together for morning gossip over a cup of coffee.

Edward Lloyd started the publication of a weekly paper about 1690 and as this was long before wireless or radio or steamships, the foreign trader immediately took to this means of catching up on all the latest shipping information. This paper, known as "Lloyd's News", was later followed by "Lloyd's List" and then "Lloyd's Register" as we now know it. The great institution of Underwriters at Lloyds is now the most famous insurance organization in the world.

Those of you who are directly or indirectly engaged in shipping realize that the marine insurance policy is one of the three important parts to an international commercial transaction in the world wide commerce of today. Particularly since the end of the first World War in 1918, the Letter of Credit has become a recognized factor in foreign trade. The three vital factors are Shipping, Banking and Insurance. I omit reference to the property or merchandise which is shipped, but refer only to that part of industry that joins together to complete the transaction.

The carrier must provide for the transportion with a "bottom" wherein seaworthiness is implied. The banker must furnish the necessary funds and the credit. The underwriter arranges the contract of indemnity to guaranty reimbursement in the event an Act of God or peril of the sea is encountered and a loss sustained.

Prior to World War I, marine insurance protected the shipper generally after the merchandise was delivered to the vessel. However, Marine Underwriters have always been the individuals in the insurance business with the highly imaginative mind and have always stood ready to offer a form of indemnity tailor-made for the needs of the Assured. Since World War I, marine insurance has come ashore and the "warehouse to warehouse" clause has become standard equipment. This clause extends the policy so that the insurance company assumes liability from the time the shipment starts its initial movement to the dock from any interior point of origin whether by rail or truck. Insurance continues after unloading from the vessel at final destination until the consignee or his agent takes possession or until the expiry of 15 days usually, whichever shall first occur.

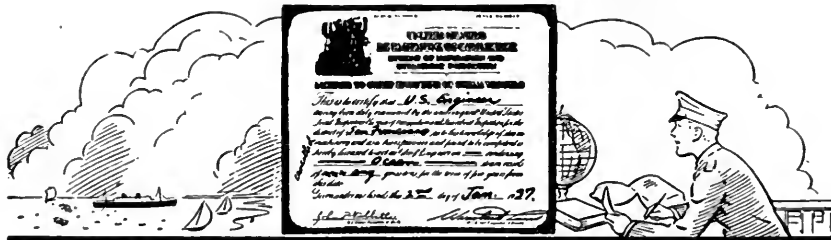
The marine insurance policy refers to "perils and misfortunes that shall be encountered etc." but generally speaking the commonly known risks are Sinking, Stranding, Fire and Collision plus General Average. Extension of the policy to include Theft has long been known but the addition of Theft, Pilferage and Non-Delivery has become increasingly popular since the end of World War II. Various cargoes call for different insuring conditions. Loss due to breakdown of refrigeration equipment is common for cargoes of perishables. Rusting and sweating damage is insurable and popular for cargoes of canned goods as is molding along with damage by worms and weevils to shipment such as flour.

Marine Insurance has many terms which are particularly odd to the layman. The word Average is the marine underwriters method of referring to "Loss." W. A. is the abreviation for With Average or With Partial Loss F. P. A. means Free of Particular Average or Free of Partial Loss. F. P. A. E. C. means Free of Particular Average English Conditions and F. P. A. A. C. means Free of Particular Average American Conditions. I will not go into an explanation of the difference between English and American conditions as that is a subject in itself. A few other common abbreviations which most of you may recall having seen are F. C. & S. meaning Free of Capture and Seizure and S. R. & C. C. meaning Strikes Riots and Civil Commotion.

The ship owner came into his own back in 1893 with the enactment of a United States Federal statute known as the Harter Act. This was a law passed to exempt the carrier from certain types of claims for which he was liable at common law. Previously, the carrier was bound to accept loss of goods shipped unless caused by Acts of God or the public enemy or decay of perishables and mortality of animals. Section 3 of the Harter Act is the most important part and it provides that:

"If the owner of any vessel—transporting property

(Please turn to page 92)

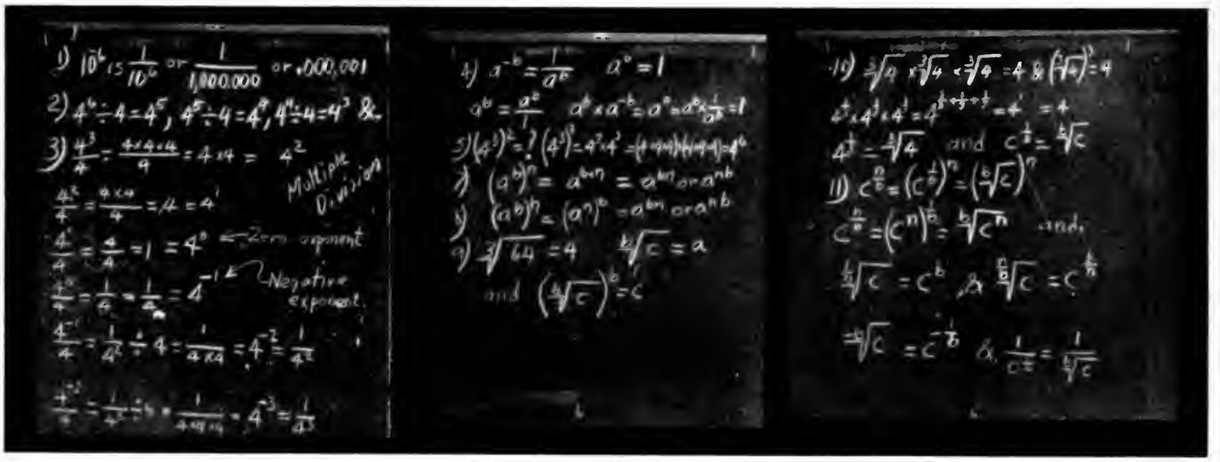


Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"CHALK TALKS" ON APPLIED MATHEMATICS



Blackboard figures mentioned in the text.

Who Likes Figures?

THE *General R. M. Square* was out of San Francisco two days, bound for several ports in the Orient. It was just past 2100 and young Douglass (Doug) Miller, third assistant, was on watch in the for'd engine room. Staff Chief Frand Farran and the other assistants were in the officers' mess wrangling over the events of the day, radio news, the "chow", pay, strikes, cost of living, slow promotion, and the standard off duty subject, women.

Conversation lagged when Fred McCoy, Mac for short, second assistant, opened up. He always took the negative of any subject, but with a twinkle in his eye and his fingers crossed. He learned by disagreeing with everybody. It would be more nearly correct to say that everybody learned when Mac started to disagree.

"Say Frank, have you been following this stuff in the Pacific Marine Review under "Your questions Answered" by the Chief? Now they want to make us mathematicians. Who writes that stuff?"

"Oh I don't know, Mac. Those fellows have to have some kind of an education, you know." Frank Farran was the discussion leader and always the theoretical and sober type. He had graduated from a teachers college in the West but loved the life at sea too much to be tied

down to a class room. He still had the instructor's approach to a subject. Having obtained his chief's license years ago, he was soon to go out on his own ship as chief. He strongly believed that every man made his own destiny and must somehow educate himself.

"Well I think it's the bunk to feed us mathematics. None of us in the engine room ever use it. I'll bet nobody reads this stuff." McCoy really meant this.

First assistant Bill Clark's answer was short and quick. "You read the stuff or wouldn't be arguing about it. I figure that is just what the author wanted, whoever he is. If a writer can get people to arguing about his ideas, he is happy. The worst thing you can do to a writer is to read the stuff and not have any reaction of any kind. And what's more, I saw you numbering the spokes of the feed pump discharge valve and tabulating the valve position against pressure and boiler pressure. Counting, numbering and tabulating is mathematics, applied."

"Don't be silly, Bill. I always have done that. Anyone knows enough to figure things out a little," said Mac.

"Oh yeah. Then why were you showing George all about it and talking to him like a father and proud too?"

Young George Campbell was the Junior engineer and always wiling to learn from his seniors.

Frank Farran spoke up again. "The article says right in the beginning that the writer does not want to make mathematicians out of you. He only wants you to learn logic and to think. A little thinking by all of you guys might not be harmful to you or the ship. Crabbing, griping, repeating in circles is not thinking. Logical thinking is what you all need. That means to reach a conclusion, prove it in as many ways as you can, and to check it with what others say or have written about it."

Frank continued. "But the author is too simple with you. He thinks we are sixth graders. You should have been over it in high school. He says he is going to write about zero and negative exponents next time."

Bill Clark interrupted. "Frank, what would you say about a negative exponent, like, for instance 10^{-6}."

"Yes, please, Mr. Farran. Tell us about it," said Doug Miller.

"Oh, Oh, boys, hang on to your pencils and paper, here we go again. Thank goodness I go on watch at 2400 to break this up." Fred McCoy knew what was coming.

"Now look." Frank talked and wrote rapidly. "The minus 6 exponent has no meaning unless we give it one by mutual understanding; then it becomes a very useful tool and expands the arithmetic shorthand. 10^{-6} has this meaning. (Fig. 1) It is a convenient way to write .000001 and saves time in writing."

"Oh yeah, but why, why, why?" Mac cut in.

"Well, as the last article said, we can multiply two powers of a number like n^3 and n^2 by adding the exponents to give n^5. You see, 3 plus 2 is 5. Let's try subtracting exponents to give a negative exponent and see if it means dividing the two powers of a number. Take the number 4 and give it the power of 6 like 4^6. Dividing continuously we get . . ." He figured slowly. (Fig. 2). "And if this succession of divisions is further carried out we get this series." (Fig. 3)

"And in general we can logically say that . . ." (Fig. 4). "The minus sign before the exponent logically means the reciprocal of the number with the positive power. 10^{-6} means $1/10^{-6}$ means 1 divided by 1,000,000 means .000001. OK?" He paused, "You guessed it, this process of successive division is called *evolution*. The word has an equivalent meaning when used by the scientists expounding on the theory of evolution in which they claim that Mac here came from a family of monkeys through a series of many generations of dividing of families."

"And furthermore" continued Frank, "The question

(Please turn to page 92)

A "Skipper" Question Answered

At Sea

Dear Skipper:

I serve as deck officer (second mate) in the Esso-Standard Oil of New Jersey Fleet.

Your publication is received aboard regularly and it is with great interest I read and study item "Steady As You Go." Navigation, besides being my livelihood, serves as my hobby. We may be able to correspond on common ground; I am a member of the "Society of Navigation."

Wonder if you have a collection of "Steady As You Go" articles appearing in past REVIEWS that I might obtain?

Do you know if I can find a slide rule that might be employed in solving the spherical triangle? Of course I am looking for an instrument that reads to one minute of arc for all angles.

Have written several slide rule makers but there seems to be no rule to this precision, which marine navigation demands.

Thank you,
Sincerely,
J. J. Leahy

5463 Hawthorne Place
New Orleans 19, La.

The Skipper Replies:

(The slide rule will be discussed more completely in these columns in the near future.) Answering this specific question, we can say that it is used in problems where multiplication, division, raising to powers or extracting roots are involved. Some rules also have scales which are graphic plots of the natural functions of the angles such as sine, cosin and tangent. Because these values vary so rapidly near zero or 90 degrees as the case may be, the scales becomes useless because of the fineness or closeness of the calibrations. Tables of values must be used instead. Therefore, no rule is made by which accuracy of calculation to one minute of arc is possible.

There are other shortcut methods of navigation developed by the Navy and by the Air Forces for quick approximate location, such as 15 miles or so. These use special sliding scales and circular scales where the triangle is solved by actual layout of the angle on a quadrant.

Admiralty Decisions

By HAROLD S. DOBBS *of San Francisco Bar*

Marine Insurance

Analysis of Cargo Theft, Pilferage and Non-Delivery Clause (A Case Tried in Egypt)

A MOST INTERESTING case comes to my attention decided by the Mixed court of Appeals of Alexandria, Kingdom of Egypt, entitled *Joseph N. Haddad & Co.* v. *The Reliance Marine Insurance Co., Ltd. and The English Coaling Co., Ltd.* The case concerns the interpretation of the meaning of a Cargo Theft, Pilferage and Non-delivery Clause contained in a policy of marine insurance dated sometime in 1942 on a shipment of galvanized iron wire from a United States port to Suez, wherein there was a shortage of 135 reels. Both the appellant and the insurance company were in agreement at the time of the trial that the question of controversy simply concerned the interpretation of paragraph (b) of the "Theft, Pilferage and Non-delivery Clause" of the policy, reading as follows:

"(b) it is hereby agreed that this policy covers the risk of Non-Delivery of an entire package for which the liability of the Shipowner or other Carrier is limited, reduced or negatived by the Contract of Carriage by reason of the value of the goods."

"Underwriters to be entitled to any amount recovered from the Carriers or others in respect of such losses (less cost of recovery if any) up to the amount paid by them in respect of the loss."

The court recognized that it would be required to decide under the clause recited whether the insurance company could be held responsible where facts show that the undelivered merchandise was actually discharged by the carrying ship whose liability is accordingly negatived. The court in a most interesting manner referred many times to decisions of its own body on similar cases. In one of which they speak, although the court negatived the liability of the assurer in a similar case, it was quick to indicate that it found itself confronted by several new elements in this case which are of decisive importance for a finding of such liability. The assurers urged the court to sustain objection to the admission of any proof of a mere custom or of a liberal construction to annul the formal clause of the policy as the assured had urged. The court, in answer, said that although they recognized the principle urged by the assurers, they would be constrained to reach a definite conclusion when the question is presented as it is here of a clause conceived in ambiguous terms difficult to comprehend.

The custom followed would appear to be of particular and paramount importance. The terms of the entire contract should be construed not with relation to the single purpose envisaged by the draftsman of the contract, but rather according to the normal interpretation which the other contracting party is legitimately entitled to place upon them. The court concluded that the recited clause (paragraph (b)) was completely ambiguous.

In reply to the assurer's claim that the policy only contemplates the payment of the difference between the amount for which the carrier is liable and the sum insured, proportional to the number of parcels undelivered, the court said quite properly that the clause made no mention whatever of any difference, appearing on the contrary on first inspection to cover "the risk of non-delivery of an entire package". Therefore, the limitation of the risk to the payment of a difference as claimed by the assurers could only be derived indirectly from the ambiguity of the last few words of the clause concerning the value of the merchandise. The phrase is confused further by the use of the word "negatived" in respect to the last phrase of the paragraph "by reason of the value of the goods". The court failed to assign a rational meaning to this language, and therefore concluded that one might be easily led astray because of an inability to properly understand the language of the paragraph which might very well lead a merchant not specially versed in the subject to rely on the preceding phrase and to conclude that the risk was covered in a case where the responsibility of the carrier had been released by the discharge of the goods according to the bill of lading conditions.

We all know that the law has been well settled both here and abroad with respect to the interpretation of insurance policies where doubt is found to exist; the law being that doubt shall be interpreted in favor of the assured simply because the assurer who composed the contract is presumed to have had the opportunity of avoiding every equivocation as to the extent of the risk.

The Egyptian court concluded that the responsibility of the assurer was in general engaged for the non-delivery of the merchandise under the facts presented. The court ordered, or to use the court's specific language, "the Reliance Marine Insurance Co. Ltd. to pay to appellant the sum £577.790 (English pounds) together with interest and costs and expenses of all proceedings including the fees of the appellant's counsel".

It is interesting to note that the Egyptian court not only gives the appellant the damages he becomes entitled to under his complaint, but in addition adds all the expense to which he has been put, including attorney's fees, so that in the end, if he recovers, he does not find himself as so many American clients do, out of pocket for the costs of prosecuting the suit even through successful in obtaining judgment.

Pacific World Trade
Reg. U. S. Pat. Off.

Cleveland Painting for APL President

A group of American President Lines and General Electric Company executives admire an oil painting of the S.S. President Cleveland by Walter L. Greene, well known marine artist, which was presented to American President Lines' President George Killion by General Electric's West Coast Manager, Allen Jones, at a recent Family Club luncheon. In the picture, left to right, are: Hugh Mackenzie, Vice President of American President Lines; George Crow, Manager of General Electric's Marine Department; Captain Hobart J. Ehman, Master of the S.S. President Cleveland, Allen Jones and George Killion.

ECA on American Ships

Henry E. North, newly elected President of San Francisco Chamber of Commerce.

George L. Fox, General Manager, San Francisco Chamber of Commerce.

The San Francisco Chamber of Commerce has performed a real service in making vehement protests over the announcement that the Economic Cooperation Administration would no longer carry fifty per cent of the gross tonnage of ECA commodities in American ships.

In strongly worded telegrams to ECA Administrator Paul G. Hoffman and Senator Styles Bridges, chairman of the Joint Committee on Foreign Economic Cooperation, G. L. Fox, general manager of the Chamber, protested that the contemplated action would be inimical to the American Merchant Marine and would result in little or no saving.

The Fox telegram said:

"Greatly alarmed about your announcement that American shipping will not be utilized to carry 50 per cent ECA cargoes. Such action inimical to American Merchant Marine including San Francisco companies operating ships on Atlantic. Believe it will result in no saving as exclusive or substantially greater use of foreign vessels will bring increase in ocean rates and offset contemplated economies. Suggest this action be deferred to give Congress opportunity to review whole matter."

Walter A. Rohde, manager of the Transportation Department of the Chamber, pointed out that the contemplated action would result in putting an estimated five or six thousand American seamen out of work.

Hoffman's action is based on a provision in the ECA Act permitting American ships to be used to the extent that they are available at market rates.

"It is apparently Hoffman's view that the vessels of foreign nations can be obtained at lower market rates, but developments since the announcement was made indicate that this conclusion may be in error. One immediate result thus far has been that the foreign flag operators have indicated their charter rates would be increased," Rohde said.

The Chamber position is also being called to the attention of President Truman, the Foreign Relations Committees of both Houses, the Chairman of the Committee on Merchant Marine and Fisheries and the Committee on Interstate and Foreign Commerce.

The Chamber's new president, Henry E. North, and General Manager, George L. Fox, give evidence of positive action in behalf of San Francisco's major asset, its shipping. This has long been needed.

New Southern California Officers for Shipping Groups

FOREIGN TRADE ASSOCIATION OF SOUTHERN CALIFORNIA.

President, Philip Stein, U. S. Customs Attorney

1st Vice President, T. R. Stetson, Pacific Coast Borax Company

2nd Vice President, B. D. Blanchard, Richfield Oil Corp.

Treasurer, A. M. Gaines, The Farmers & Merchants Natl. Bank

Secretary, Manuel Avila, Attorney

Chairman of the Board, S. J. Hindle, American President Lines, Ltd.

LOS ANGELES CHAMBER OF COMMERCE—RE-NOMINATED AS DIRECTORS FOR 1949.

LeRoy D. Owen, Chairman of the World Trade Committee.

Fred A. Hooper, Chairman of the Harbor Affairs Committee.

Earle V. Grover, President of the Apex Steel Corp., Ltd. was nominated for the 1949 Presidency of the Chamber.

EXPORT MANAGERS CLUB OF LOS ANGELES

President, E. H. Hollinshead, General Specialties Co.

Vice-President, T. W. Winner, Plomb Tool Company.

Secretary-Treasurer, Ernest P. Gonzales, The Pegern Company.

DELTA PHI EPSILON ALUMNI ASSOCIATION OF SOUTHERN CALIFORNIA. (National Foreign Service Fraternity)

President, Horace W. Cutler; Vice-President, Claude V. Smith; Secretary, John A. Sowers; Treasurer, Ross O. Cordy.

December Meeting of Junior World Trade Association

Left to right: Mel Freeman, Tidewater Associated Oil Co.; Harrison H. Fuller, president, Bethlehem Pacific Coast Steel Corp.; George Schmitz, Wells Fargo Bank and Union Trust Company, president of Junior World Trade Association; Eric Pedley, Pedley-Knowles & Co.

Mr. Fuller addressed the association on the steel situation on the Pacific Coast.

San Francisco World Trade Election

G. A. Gumbrecht has been elected 1949 president of the World Trade Association of the San Francisco Chamber of Commerce. He succeeds 1948 president W. J. Gilstrap.

Gumbrecht is president of the Henry W. Peabody & Co. of California, Inc., prominent Import-Export firm, and has been a director of the World Trade Association for several years. He headed the Chamber's Foreign Trade Zone committee during the time when the committee was actively campaigning for a zone in San Francisco.

Other officers elected for the comming year are: First Vice President, Ralph V. Dewey, Marsman and Company; Second Vice President, Victor B. Smith, Sperry Flour Company; Third Vice President, W. I. Nelson, Frazer & Hansen, Ltd.; Treasurer, Robert Taylor, American Trust Company; and Secretary-Manager, Alvin C. Eichholz, World Trade Department, San Francisco Chamber of Commerce.

In addition to the officers, other members of the executive committee of the Association are: C. D. Anderson, Golden State Company, Ltd.; Victor L. Arenth, Southern Pacific Company; Dale L. Blanton, Atkins, Kroll & Company; Windsor A. Brown, Balfour, Guthrie & Co., Ltd.; Harry C. Dunlap, Dried Fruit Association of California; L. G. Dunn, Pacific Far East Line, Inc.; Frank B. Howland, Oceanic Forwarding Company; Howard Hutchins, The Bank of California, N. A.; John Jacobs, Isthmian Steamship Co.; T. R. Jamieson, Otis, McAllister & Co.; E. R. Knauf, Crown Willamette Paper Co.; Arthur P. Lazarus, Getz Bros. & Co.; J. J. Lermen, Jr., Tide Water Associated Oil Company; Ira S. Lillick, Lillick, Geary, Olson, Adams & Charles; James C. Morrison, J. J. Moore & Co., Inc.; A. E. Ojeda, Standard Oil Company of California; Ray C. Robinson, Sr., Harper, Robinson & Co.; J. H. Rogers, Pan American World Airways System; Richard S. Turner, The R. S. Turner Company.

G. A. Gumbrecht, who has been elected 1949 president of the World Trade Association of the San Francisco Chamber of Commerce.

George H. Harlan

Port Engineer of the Month

SAN FRANCISCO

GEORGE H. HARLAN

Of The Army Transportation Corps

Napoleon was a man of such small stature that he could not have qualified for letter carrier in the San Francisco postoffice. George Harlan is also of limited stature, but he is an important wheel in the machinery of the Army Transportation Corps, and is secretary-treasurer of the Port Engineers Society of San Francisco.

With the Port of Embarkation George has contributed substantially to architectural layouts of transports in the conversion program, especially in the design work on animal ships. He is a member of the Society of Naval Architects and Marine Engineers.

The Harlan family were pioneers of Sausalito, California, where the first house built is still owned by George's father. George studied law at the University of Nevada, and has a certificate for practicing mechanical engineering. For a while he taught drafting at the California School of Mechanical Arts.

As an anchor to leeward George is also a railroad man—in a small way. He has been president of the Model Railway Association for six terms. Another hobby is color photography, and he can fish and shoot. *Pacific Marine Review* readers will have read some ably prepared articles on ship repairs and conversions, for he has journalistic experience also and can rig a good story for constant readers or for his wife, Vera.

- - With The

December Meeting of San Francisco Society

Top: R. L. Lasher of Robert L. Johnson Co., representing Combustion Engineering Co., Inc., and Marshall Garlinger, Fort Mason.
Mr. Garlinger presented, through the courtesy of The Electro-Chemical Engineering Corp., Division of Dearborn Chemical Company, three reels of motion pictures as a study of boiler operations. Mr. Lasher presented two films entitled, "Steam Progress," and "Building Boilers for Ships."

Bottom: Ed Graff, Grace Lines; Bob Streiff, Pacific Tankers (new president of the San Francisco Society) and Ira Chapman, American President Lines.

Port Engineers-

John Leslie Expounds Valve Technique

Top: John Cordes of Cordes Bros.; John S. Leslie, president of Leslie Co. and Lowell Jett of Cordes Bros., pictured at the Mariners Club, San Francisco.

Bottom: John S. Leslie, explaining valve features, developed through three generations of Leslies, to Bernard Ross and Rodney Eldon at a meeting of the San Francisco Society of Port Engineers.

Ray C. Jones

Port Engineer of the Month

LONG BEACH

RAY C. JONES

Of General Petroleum Corporation

Starting with San Francisco's Union Iron Works in 1902, Ray Jones went to sea in 1905 as a water tender with the Pacific Mail and the Oceanic Steamship Company, serving on the *Mongolia, Alameda* and *San Jose.*

He became an engineer for Pacific Mail in 1907 and remained with them until 1911 when he went to Alaska where he was First Engineer and Chief Engineer for the Northern Navigation Company on the Yukon River. He was with them until 1916, and in 1917 went into the Navy for a two year hitch. Getting out of the Navy in 1919, he joined up with Standard Oil of California as an Inspector in charge of new construction.

Ray started with General Petroleum Corporation in 1922. He was Chief Engineer, then Port Engineer, and in 1925 was made Superintending Engineer, the job he holds today.

Dan Dobler

Dan Dobler Elected President of Los Angeles Society

Elected unanimously as the new president of the Los Angeles-Long Beach Society of Port Engineers was Dan Dobler of the Texas Company. The election took place at the December meeting of the Society held at the Lafayette Hotel December 1. Hamp Neergaard of Burns Steamship Company was elected vice president and Bert Hale of Marine Solvents Corporation was re-elected secretary.

Left to right: Bert Hale, Marsol Corp., re-elected secretary of Los Angeles Society; Joe Wosser, Matson Navigation Co., outgoing president; Hamp Neergaard, Burns Steamship Co., new vice president.

Puget Sound Society Elects Officers

At the annual Christmas party of the Puget Sound Society of Port Engineers, held December 8, the following new officers were elected: President, Mickey Felton, Alaska Steamship Co.; Vice President, Dick Storrs, American Mail Line; Secretary-treasurer, Ed Tucker, U. S. Maritime Commission. Felton succeeds H. B. Moore of Matson Navigation Company.

New board members are: Jack Gilmour, Alexander Gow, Inc.; Frank Howard, American Mail Line; Louis Simonsen, Standard Oil Company. Captain Whit Hill, recently retired from the Coast Guard, was voted an honorary member.

December Meeting of Los Angeles Society

Clockwise around the table: Robinson, Long Beach Marine Repair; Hoxie, American President Lines; Black, American Bureau of Shipping; Shipley, Westinghouse; McCoy, Marine Solvents; Hare, Maritime Commission; Pike, American Bureau of Shipping; Gulvin, American Pacific Steamship Co.; Cyrus, Union Oil Co.; Bradford, Time Oil Co.; Neergaard, Burns Steamship Co.; Hale, Marine Solvents Corp.; Jones, General Petroleum; Campbell, Federal Paint.

NEW PRESIDENT
OF
SAN FRANCISCO
SOCIETY
Bob Streiff

NEW
VICE PRESIDENT
OF
SAN FRANCISCO
SOCIETY
M. C. Wright

New Officers of San Francisco Society

Recently elected officers of the San Francisco Society of Port Engineers were Bob Streiff of Pacific Tankers, President; M. C. Wright of Deconhill Shipping, Vice President; George Harlan of the Army Transportation Corps (Port Engineer of the Month for January), Secretary-Treasurer. See page 64.

A Letter to Andy

The following letter was received by Andy Disher after his appearance as Port Engineer of the Month.

CARL F. FENNEMA
Catalina Terminal
Wilmington, California
Nov. 24, 1948

Dear Andy:

Seems to me you're getting a lot of publicity for yourself as Port Engineer of the Month in the November issue of the Pacific Marine Review. And if that was a recent picture you're getting younger looking every day!

I got a kick out of the article, particularly reading about the old NWP ferryboats. All of them are gone now but they bring pleasant memories when I think back to the good old days on the NWP. 'Twill be 40 years come next January that I started working for the outfit at Tiburon. Time does march on or something, doesn't it?

And instead of worrying about where the 49'ers play you should think about the NY Giants! That kid playing center for the Giants ain't me but it is Carl Jr.

Best wishes for a most enjoyable Thanksgiving and the coming holiday season. If you run in to any of the old timer's from the NWP give them my best regards.

Sincerely,
CARL FENNEMA.

Port Engineer Promoted

W. S. Sturgill, longtime port engineer for Matson Navigation Company, Honolulu, recently returned from Honolulu to San Francisco where he has been assigned as Assistant Superintending Engineer. This represents an enlargement of Jack Williams' department in San Francisco.

The important vacancy in Honolulu is being filled by Joe Wosser, transferred from Wilmington, Cal.

Transferred to Honolulu ▶

Joe L. Wosser, Engineering Representative of Matson Navigation Company (opposite), who was recently transferred from Wilmington, Cal., to Honolulu.

On the Ways

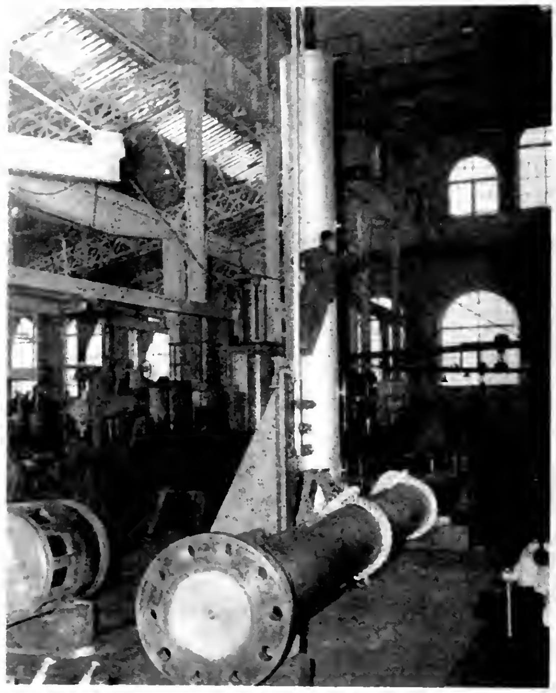
New Construction — Reconditioning — Repairs

Spare Tail Shafts

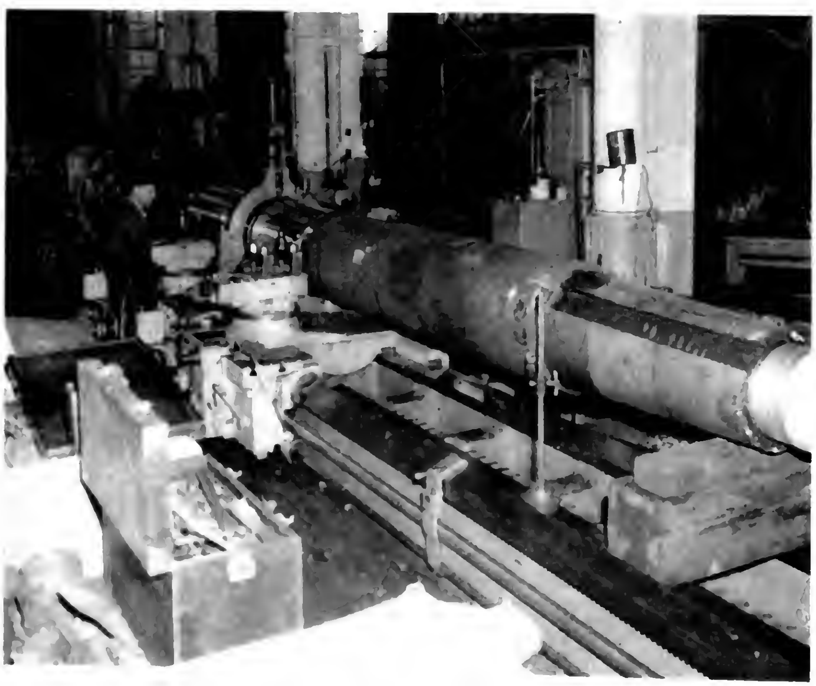
Bethlehem Shipyard, San Francisco, has just completed fabrication of eleven spare shoreside tailshafts for the Army Transportation Corps, one of which had the longest single liner ever placed on a shaft at this yard.

All eleven of these shafts were forged in the yard's blacksmith shop, then machined and fitted with Bethlehem's special composition spun brass liners.

The photographs show the final steps in the completion of the longest of the eleven shafts. The one shown weighs approximately 41,000 pounds and is 21 feet, 1¼″ long. The liner alone is 23 feet, 4¾″ long and has an outside diameter of 23¼″. It is to be used as a spare for a CZ-2 or a modified C-2 type vessel.



Before being shrunk on the shaft shown in the foreground, the bronze liner, inclosed in a vertical cylinder, is heated for several hours by means of a gas flame. Machinist is shown recording temperature of liner being heated in the vertical cylinder in background.



After the liner has been shrunk on the shaft and given sufficient time to cool properly, it is finish-turned on the 65 foot lathe in the yard's huge machine shop.

Repairs by Bethlehem

Vessel loading at her own berth while Bethlehem craftsmen complete repairs which started with dry-docking at a nearby Bethlehem yard.

ake advantage of the money-saving characteristics of fast turn-around and mini-ıum lay-up time by consulting Bethlehem about its THREE-WAY SERVICE henever your ships need repair.

nder this service your ships can be repaired:

(1) In any one of the modern and completely staffed and equipped Bethlehem yards most convenient to you, *or*

(2) At your own berth, and in such manner as to permit cargo loading while repairs are being made, *or*

(3) In any one of Bethlehem's yards for dry-docking and underwater work, with preliminary or completion work at your own loading berth.

his THREE-WAY SERVICE has been designed to help you maintain sailing :hedules and to cut your maintenance costs and lay-up time. For maximum satis-ıction at minimum cost whenever your ships need repair always specify, "Repairs y Bethlehem."

SHIPBUILDING YARDS

QUINCY YARD
Quincy, Mass.

STATEN ISLAND YARD
Staten Island, N. Y.

BETHLEHEM-SPARROWS POINT SHIPYARD, INC.
Sparrows Point, Md.

BEAUMONT YARD
Beaumont, Texas

SAN FRANCISCO YARD
San Francisco, Calif.

SAN PEDRO YARD
Terminal Island, Calif.

SHIP REPAIR YARDS

BOSTON HARBOR
Atlantic Yard
Simpson Yard

NEW YORK HARBOR
Brooklyn 27th St. Yard
Brooklyn 56th St. Yard
Hoboken Yard
Staten Island Yard

BALTIMORE HARBOR
Baltimore Yard

GULF COAST
Beaumont Yard
(Beaumont, Texas)

SAN FRANCISCO HARBOR
San Francisco Yard
Alameda Yard

SAN PEDRO HARBOR (Port of Los Angeles)
San Pedro Yard

SHIPBUILDING . . . SHIP CONVERSION . . . SHIP REPAIR
NAVAL ARCHITECTS and MARINE ENGINEERS

BETHLEHEM STEEL COMPANY

Shipbuilding Division

GENERAL OFFICES: 25 BROADWAY, NEW YORK 4, N. Y.

Coast Commercial Craft

Charles Tobias, Production Supervisor at Bethlehem's Alameda Yard, greets George Harrison, senior pilot of the "Dennis T. Sullivan," upon arrival of the vessel at the yard, while R. Dale Keeley, Superintendent of Equipment for the San Francisco Fire Department, looks on.

San Francisco's Double Duty Fireboats

The only two vessels in the United States originally designed as an integral part of a city's high-pressure water system are San Francisco's two fireboats, the *Dennis T. Sullivan* and the *David Scannell.* Both of these were built in 1909 at Risdon Iron Works in San Francisco, now a part of the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division. Although built 39 years ago, each is still capable of pumping at the 10,000 gallon-per-minute rate for which she was orginally designed. Both vessels are classified for inland waterway service only and both are used to fight either a waterfront or a shipboard fire.

A unique feature about these vessels is the arrangement whereby the pumps on either vessel can be connected directly to San Francisco's high-pressure fire fighting water system in the event of an emergency.

The *Dennis T. Sullivan,* shown in the photograph, and her sistership the *David Scannell,* recently underwent annual drydocking, botton cleaning, and painting at the Alameda Yard of Bethlehem Steel Company, Shipbuilding Division. The *Dennis T. Sullivan* is skippered by George Harrison, senior Pilot, who has been captain of the vessel for 25 years.

The *Dennis T. Sullivan* is 129 feet long, has a beam of 26 feet, and her propulsion machinery consists of two 450 H. P. compound reciprocating engines. She is twin screw, and equipped with two 600 H. P. Curtis Pump Turbines.

San Francisco fireboat "Dennis T. Sullivan" shown prior to being drydocked at Bethlehem's Alameda Yard.

NEWS FLASHES

LUCKENBACH WEST COAST BIDS

Bids were opened December 29 on Luckenbach's "Sea Star" and "Sea Flyer", now in Puget Sound. Amount of the bids has not been announced, but Todd's Seattle yard seems to be low on both ships.

Bid opening on the "Sea Cat", "Sea Devil" and "Sea Bass", which were scheduled for opening January 5, was postponed to January 17. Bids on the "Sea Runner" and "Sea Barb" are not yet all in. The latter five vessels are on San Francisco Bay.

For conversion story on these ships see feature article in this issue.

* * * * *

BIDS ON 40 LAID-UP SHIPS

Forty vessels in the Tongue Point reserve fleet show the following:

Willamette Iron & Steel Company, Portland	$ 729,478
Electro Marine, Inc., Seattle	$ 735,375
Commercial Ship Repair, Seatttle	$ 778,842
Northwest Marine Iron Works, Portland	$ 834,500
Astoria Marine Construction Company, Astoria	$ 835,982
Todd Shipyards Corporation	$1,051,204

* * * * *

COAST GUARD ORDERS 60 WESTINGHOUSE MARINE RADAR SETS

Sixty Westinghouse marine radar sets--comprising the largest contract ever awarded by the U. S. Coast Guard for this type of equipment--will provide "all weather" eyes for Coast Guard vessels performing vital shipping services on coastal waters, inland waterways, and the Great Lakes.

* * * * *

WEYERHAEUSER BUYS LIBERTYS

Purchase of two Liberty ships by the Weyerhaeuser Line for operation in its intercoastal services is announced by L. J. Rogers, Pacific Coast manager of the line, with headquarters in Tacoma.

The two new units, acquired from the Maritime Commission at an approximate cost of $1,300,000, brings the Weyerhaeuser fleet up to a total of six ships and

only two short of the prewar fleet size. Both ships are from East Coast reserve.

* * * * *

MERCHANT MARINE--NAVAL RESERVE

On subsidized ships before a Deck or Engineer Officer may sign articles he must show (a) Naval Reserve membership, or (b) ineligibility therefor, or (c) application for appointment in the Naval Reserve dated within three months. Naval Officer Procurement Offices have been furnished the names and official numbers of 235 vessels now holding an operating-differential subsidy and 9 other vessels affected. Applications for the Naval Reserve by licensed Deck and Engineer Officers employed or to be employed on these 244 ships will be processed as quickly as possible. Meantime, applicants will be furnished a signed statement as evidence to the shipping commissioner that such an application has been made, and action is pending.

* * * * *

PRESIDENT'S BUDGET

President Truman's budget includes provision for seventeen new ships. Ten of these would be 20-knot tankers, two would be the proposed prototype freighters, two would be 17,000 ton liners for Grace Line, one would be a 20,000 ton liner for Mississippi Shipping Co. and two would be freighters for Standard Fruit. It seems almost certain that some of these would be Pacific Coast built.

* * * * *

ATOMIC SHIP ENGINE

The Atomic Energy Commission announces that a contract has been arranged with the Westinghouse Electric Corp. to build an experimental atomic engine to propel warships.

* * * * *

TODD SHIPYARD GETS CONTRACT FOR REPAIRING GOLDEN BEAR

The U. S. Maritime Commission has awarded the contract for the annual overhaul of the training ship, Golden Bear, of the California Maritime Academy, to Todd Shipyard, Alameda. The overhaul will include dry docking, minor repairs to machinery and various improvements to make the vessel more suitable as a school ship for midshipmen.

* * * * *

DRAVO'S 444 HULLS

An average of one hull was launched every 2-1/3 days during 1948 by Dravo Corporation at its Pittsburgh and Wilmington shipyards.

This brought to 444 the total number of hulls constructed and launched by Dravo since the end of World War II, exceeding by 47 the number of vessels launched during the company's wartime shipbuilding program from 1941 to 1945.

As of January 1, 1949, Dravo had orders for more than 110 hulls to be launched at its two shipyards.

Vessels Under Construction

And /or Under Contract December 1st, 1948

BUILDING TO AMERICAN BUREAU OF SHIPPING CLASSIFICATION

Builder	Hull No.	Type-Size Name	Power	Owner	No. of Vessels	Est. Gr. Tons D.W. Tons
SEAGOING						
Bethlehem-Sparrows Pt. Shpyd., Sparrows Pt., Md.	4464- 4465	Oil Tanker 524'x68'x37'6" "Atlantic Prince"—Hull 4464 Keel Laid 5-10-48—Launched 10-8-48 "Atlantic Princess"—Hull 4465 Keel Laid—6-14-48—Launched 11-24-48	Turbine 6050 H.P.	Atlantic Maritime Co. New York, N. Y.	(2)	10,901 ea. 18,151 ea.
do	4466	Oil Tanker 524'x68'x37'6" Keel Laid 7-26-48	Turbine 7700 H.P.	Foreign Interests	(1)	10,901 18,000
do	4467 4468	Oil Tanker 595'x84'x44' Hull 4467—Keel Laid 7-19-48 Hull 4468—Keel Laid 9-7-48	Turbine 13,750 H.P.	Gulf Interests New York, N. Y.	(2)	16,750 ea. 28,000 ea.
do	4469	Oil Tanker 595'x84'x44' Keel Laid 10-11-48	Turbine 13,750 H.P.	Foreign Interests	(1)	16,750 28,000
do	4470 4471	Oil Tanker 595'x84'x44'	Turbine 13,750 H.P.	Gulf Interests New York, N. Y.	(2)	16,750 ea. 28,000 ea.
do	4472 to 4475	Oil Tanker 595'x84'x44' Hull 4472—Keel Laid 11-22-48	Turbine 13,750 H.P.	Olympic Oil Lines, Panama, S. A.	(4)	16,750 ea. 28,000 ea.
do	4476 to 4479	Oil Tanker 487'6"x68'x37'	Turbine 7,700 H.P.	A-C Tankers, Inc. New York, N. Y.	(4)	9,900 ea. 16,500 ea.
do	4480 to 4484	Oil Tanker 595'x84'x44'	Turbine 13,750 H.P.	Foreign Tankship Corp. San Francisco, Cal.	(5)	16,750 ea. 28,000 ea.
Bethlehem Steel Co. Shipbuilding Division Quincy, Mass.	1607 to 1610	Oil Tanker 595'x84'x44' Hull 1607—Keel Laid 8-2-48 Hull 1608—Keel Laid 9-1-48 Hull 1609—Keel Laid 9-30-48 Hull 1610—Keel Laid 11- 1-48	Turbine 13,750 H.P.	The Texas Co. New York, N. Y.	(4)	16,750 ea. 28,000 ea.
do	1611	Oil Tanker 595'x84'x44'	Turbine 13,750 H.P.	Private Interests	(1)	16,750 28,000
do	1618- 1619	Passenger & Cargo 632'x89'x53' P3-S2-DL2 972 Passengers	Turbine 55,000 H.P. Twin Screw	American Export Lines New York, N. Y.	(2)	20,500 ea. 12,000 ea.
Gulfport S.B. & D.D. Corp. Port Arthur, Texas	341	Hopper Dredge 221'x44'x21' "Mariano Ospina Perez" Keel Laid 4-2-48	Unaflow 3,260 H.P. Twin Screw	Republic of Colombia	(1)	1,880
Harima Shipbuilding Works Aioi, Japan	443	Cargo Vessel 377'4"x53'6"x29'6" "KB 1"	Turbine 2300 H.P.	Sanko S.S. Co., Ltd. Osaka, Japan	(1)	4,950 6,500
Ingalls Shipbuilding Corp. Pascagoula, Miss.	526	Oil Tanker 385'x62'6"x21' "Rio Grande" Keel Laid 11-30-48	Unaflow 2800 H.P. Twin Screw Twin Screw	The Texas Co. New York, N. Y.	(1)	4,300 7,800
Kawasaki Heavy Industry Co., Ltd., Kobe, Japan	848	Cargo Vessel 367'x52'6"x29'6" "KB 3"	Turbine 2400 H.P.	The United Ocean Transport Co., Ltd. (Daido Kaiun Kabushiki Kaisha)	(1)	4,550 6,500
Mitsubishi Nagasaki Dock-yard, Nagasaki, Japan	1407	Cargo Vessel 374'x53'1½"x29'6" "Pacific Maru"	Turbine 2400 H.P.	The First Shipping Co., Ltd., Kobe, Japan	(1)	4,825 6,500
Newport News S.B. & D.D. Co., Newport News, Va.	475- 478	Oil Tanker 600'x82'6"x42'6" Hull 475—Keel Laid 7-7-48 Hull 476—Keel Laid 9-13-48 Hull 477—Keel Laid 11-15-48	Turbine 13,750 H.P.	Standard Oil Co., (N.J.) New York, N. Y.	(4)	16,750 ea. 26,000 ea.
do	479	Oil Tanker 600'x82'6"x42'6"	Turbine 13,750 H.P.	N. G. Livanos New York, N. Y.	(1)	16,750 26,000
do	480 to 485	Oil Tanker 600'x82'6"x42'6"	Turbine 13,750 H.P.	Standard Oil Co., (N.J.) New York, N. Y.	(6)	16,750 ea. 26,000 ea.
New York Shipbuilding Corp. Camden, N. J.	482 to 484	Oil Tanker 625'x85'x45'	Turbine 18,000 H.P.	Philadelphia Tankers, Inc., Philadelphia, Pa.	(3)	19,540 ea. 32,000 ea.
do	485 to 487	Passenger & Cargo 500'x73'x49' P2-S1-DN1 228 Passengers	Turbine 13,750 H.P.	American President Lines San Francisco, Cal.	(3)	12,660 ea. 10,600 ea.

(Continued on next page)

(Continued from preceding page)

The Nippon Steel Tube Co.,	653	Cargo Vessel	Turbine	Kyoritsu S.S. Co., Ltd.,	(1)	4,900
Tsurumi Shipyard,		375'x53'x29'6"	2,800 H.P.	Tokyo, Japan		6,500
Tokyo, Japan						
Sun S.B. & D.D. Co.,	566	Oil Tanker	Turbine	Standard Oil Co., (N.J.)	(2)	16,750
Chester, Pa.	568	600'x82'6"x42'6"	13,750 H.P.	New York, N. Y.		26,000
		Hull 566—Keel Laid 5-1-48				
		Hull 568—Keel Laid 9-27-48				
do	567	Oil Tanker	Turbine	Gulf Oil Corp.,	(2)	16,750
	569	600'x82'6"x42'6"	13,750 H.P.	New York, N. Y.		26,000
		Hull 567—Keel Laid 7-8-48				
Sun S.B. & D.D. Co.,	570 to	Oil Tanker	Turbine	Tankers Navigation Co.,	(7)	16,750
Chester, Pa.	576	600'x82'6"x42'6"	13,750 H.P.	New York, N. Y.		26,000
do	577-	Oil Tanker	Turbine	Standard Oil Co., (N.J.)	(2)	16,750
	578	600'x82'6"x42'6"	13,750 H.P.	New York, N. Y.		26,000
Welding Shipyards, Inc.		Oil Tanker	Turbine	Oceanic Tankships, S. A.	(1)	15,591
Norfolk, Va.	25	615'x84'x43'9"	17,500 H.P.	New York, N. Y.		30,000
		Keel Laid 10-1-48		Oceanic Tankships, S. A.	(2)	15,591
do	26-	Oil Tanker	Turbine	New York, N. Y.		30,000
	27	615'x84'x43'9"	17,600 H.P.			
				TOTAL	67	1,002,331 G.
GREAT LAKES						
American Ship Building Co.	866	Bulk Ore Carrier	Turbine	Inland Steel Co.	(1)	11,800
Lorain, Ohio		660'x70'x37'	7,700 H.P.	Chicago, Ill.		21,150
		"Wilfred Sykes"				
		Keel Laid 11-1-48				

(An early issue will contain a continuation of this tabulation, including misc. types of vessels.)

Propulsion Diesel Engines For Landing Craft and Small Boats

By CAPTAIN HOMER AMBROSE, USN, COMMANDER G. C. HUMPHREYS, USN and LIEUTENANT COMMANDER F. E. SWIDERSKI, USN, of the Bureau of Ships

Military considerations for amphibious warfare during World War II dictated the construction of six types of landing craft varying in length from 36 feet to 160 feet. Propulsion of these craft required Diesel engines of various sizes, in several combinations.

Initial search for propulsion units centered on gasoline engines. However, lack of seaworthiness of gasoline engines, particularly for smaller craft, made Diesel engines preferable. Military urgency necessitated the use of existing types of Diesels, with minor modifications to suit the applications. After extensive trials, the General Motors 6-71 Diesel engine, and the Gray Marine conversion of it, became the power plant for smaller landing craft. It was used in one, two, three, and four engine combinations. Fairbanks Morse and General Motors submarine engines were used in landing ships. Also, the General Motors, Electromotive Division, 12-567 locomotive engine was modified for landing ships.

The four engine combination of the General Motors 6-71 engine, known as the "Quad", was the most unique arrangement. Four engines, each with its own water, oil, fuel, exhaust, and electrical system, were coupled to a single shaft; clutching and control arrangements were such that the vessel could operate on any combination of individual engines or either or both "Quads".

The annual volume of Diesel engines produced for the applications under discussion increased from 200,000 horsepower in 1941 to a maximum of 10,000,000 horsepower in 1944. The production of repair parts lagged behind engine production. Finally, shortages of repair parts required deceleration of engine production and acceleration of parts production to satisfy maintenance requirements in all theatres of war.

Minor difficulties in operation and maintenance of engines demanded swift, remedial measures. An epidemic of cracks in cylinder heads indicated need for additional cooling; and alterations were devised that could be made in the field. Sea water cooling pumps failed because of intake of sand during beaching operations; also, the pumps failed because of lack of priming with water at starting. The use of neoprene reduced wear and the development of a small water reservoir in the pump casing permitted priming. Speed limiting devices, for use when full engine speed was not required, increased engine life. The use of standard sizes of repair parts was made the rule in order to facilitate their supply throughout the world. Worn parts which could be economically salvaged were returned to salvage centers, reworked, and then issued for use. Improved methods of packaging and preservation insured that parts arriving in forward areas were fit for use.

The distribution of repair parts for the great volume of engines in use became a serious problem. Initially, parts were procured as needed direct from manufacturers

(Please turn to page 87)

Analysis of paper read at 1948 meeting of Naval Architects and Marine Engineers in New York. An analysis of five other papers presented at this meeting appeared in our December issue.

Running Lights

Christmas Party—Mariners Club of San Francisco

arl Klitgaard (center) was in San Francisco from the Standard il Company of New Jersey. He was the guest of John Cordes, his left. Old friends from his Standard of California days reeted him.

pposite, top to bottom:

eft to right: Sam Gillis, Plant Rubber; Irving Reid, Pacific Coast ubber; Berry E. Dunn, Kearfott representative; John Pruner, aramount Steel; Fred Wilson, Pacific Coast Rubber.

eft to right: B. N. DeRochie, Pacific Marine Review; E. Joseph lacFarlan, Standard Oil; L. C. Gilliland, Standard Oil; E. M. lcLachlan, Union Oil.

eft to right: M. S. Torchia, T. J. Moher, F. M. Osgood and eorge Huck, all of Bethlehem Steel Corp.

rank de Pue (at the left) was one of the lucky Mariners who nerited a sweet serenade, while (at the right) Alex Ramsey hows affection for Chris Larson.

Harbor Supply New Year's Open House

Left to right: Bob Gilmore, Southern Pacific; Homer F. Potter, Atlas Paint; Ernie Charleston, American President Lines; Ray Wheeler, Moore-McCormack; Jack Bolts, Luckenbach; Al De Voto, Harbor Supply. At the extreme right of the picture, in the shadow, is Jack Presser, Pacific Far East Line.

Commercial Ship Repair Celebrates

Commercial Ship Repair attracted the cream of the maritime industry to the dinner celebrating their acquisition of facilities on San Francisco Bay through the purchase of the Marine Engineering and Ship Repair Company. Among those present were:

1. Left to right: J. A. Stasek, Al Safholm, Herb Steiner, Lou Deppman and Hal Cammann.
2. Left to right: Bud Featherstone, Al McNeil, Ralph Randall, Fred Archbold, Jack Scott and Captain Tom Klitgaard.
3. Left to right: J. L. McDowell, D. W. Deeds, A. Heflin, D. Padilla, C. V. Albin and T. Klitgaard.
4. Ira Chapman, American President Lines (second from left); W. O. Graham, Giampolini & Co.; Fred Finn; and, looking over Finn's shoulder, J. L. McDowell, U. S. A. T.
5. J. D. Clark, Charlie Weslind and Bill Brennan.
6. Fred A. Finn and the Trout brothers, Barney and Vance. Barney is now manager of Commercial Ship Repair's Tacoma yards.
7. J. J. Featherstone, Ed Black and Capt. E. W. Nystrom.
8. George Miller, of Pacific Tankers, is amused and Ed Graff, of Grace Line, is not impressed with Al Safholm's explanation.

Sopac Ship Maintenance Open House Party

Below:

Top: L. R. MacDonald, Alex Johnson and Jesse Johnson.

Bottom: Hal Wrigley, Clyde Williamson and Howard Tully.

Small group on opposite page:

Top: Tom Plant, George Duncan, Jim Camp, Tom Monroe.

Bottom: Bill Ellery, Don Johnson and Orin Jewett.

Port Engineers Frolic

The San Francisco Society of Port Engineers celebrated a highly successful year under the guidance of President Phil Thearle by staging a "stag nite of good fellowship" at Di Maggio's Restaurant at Fisherman's Wharf.

The affair was held on Saturday night (December 18) with dinner and entertainment the compliments of the Society to members. There was plenty of everything and about 150 members and guests attended.

Chairman Joe Gisler deserves a big hand on this one, for he and other members of the Board of Governors pulled it right out of the disconcerting situation resulting from the strike. The dinner-dance of 1947 and the stag-nite of 1948 were good companion pieces.

1. Left to right: Ritchie Dunn, Rodney Eldon, Todd Hecken, Ed Crough and Herb Bussell.
2. In the center, warming up to his subject, is Louis Ets Hokins. At his right is his son, Jerry, and at his left, Bill Beck of Dahl-Beck.
3. American President Lines table.
4. Hal Cammen, Al De Voto and Mac Gilmore.
5. Chief Jennings of the President Cleveland and Chief Jack Paton of the President Wilson having a friendly argument over the performance of the two liners. Literally and figuratively caught in the middle is Al Pittman of Hagan Corp. (His Hagan combustion control is on both ships.)
6. Fred Finn, George Lienhard and Bob Streiff.
7. George Horton of International Paint (center) and Henry Gelhaus of Todd Shipyards.

Refraction and Mirage

(Continued from page 48)

it may be seen from a ship close inshore, and occurs when the air adjacent to such a shore is of different density—warmer or colder—than the air a short distance away from it. A condition of this sort may result in the appearance of an object's image, reversed in direction, and along side the object it mirrors, this procedure following in principle that of the superior mirage, with the raised and inverted image.

Résumé and Discussion

Refraction is always operative in the atmosphere; its normal effects do not attract attention from the ordinary observer, but have their application in the mathematics of astronomy and navigation. When refraction becomes abnormal and forces itself upon the eye we have extraordinary visibility, or mirage in one or more of its phases.

It is indicated that certain regions on the globe are so situated geographically and with respect to general meteorological conditions as to be more favorable than others for the occurrence of abnormal refraction phenomena. These regions are cool, high interior plains and plateaus; the strongly heated deserts; the equatorial and other very warm coasts; and the polar coasts. Desert and polar coasts are particulary favorable. On the plateaus abnormal refraction is most frequently witnessed as excessive visibility and looming; and on hot and cold coasts as any one or a mixture of mirage types.

Along other coasts mirage is in general less common, and in places may never be witnessed. A coast dweller who sees mirage views it as he looks seaward, where he may discern a ship curiously distorted or apparently overturned. The observer on a ship near land usually sees mirage as a more or less unnatural image of the coastline, double, or triple, or as an appearance of the coast much further from him or nearer to him than it actually is. And herein lies a danger to navigation, which in former days, at least, caused damage to more than one good ship by reason of grounding on an elusive, mirage-distorted shore. This danger is today largely minimized by improved navigational aids, but doubtless still rises to give the navigator an additional problem of the moment.

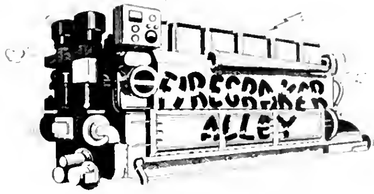
At sea-positions removed from sight of land, ships or icebergs cause the mirage most generally seen, as they are specific objects which are changed in appearance, if not actually blotted out in many details, while surrounded by an atmosphere constructed of layers or tongues of air of differing densities. But mirage along an open sea horizon is also sometimes observed, being seen as a raised line of water, sometimes resembling a waterfall, at the junction of air and water masses of differing temperatures.

Where there is ocean fog there often is mirage, since the temperature and humidity variations which favor condensation of moisture as fog in the air often are factors in causing mirage. An attendant mirage is, of course, not observable while dense fog actually obstructs the vision. True fog does not form under many atmospheric conditions that cause mirage, but mock fog—the typical refraction band—often is seen under such conditions, and at times may lead to the recording of damp, or true, fog which does not exist.

Within the fluctuating boundary regions of great semipermanent oceanic high-pressure systems extraordinary visibility and refraction, with looming and other forms of mirage, are rather often reported. Frequently, also, in connection with occurrences of mirage along middle-latitude coasts and their neighborhood weather maps have shown the refraction regions to be situated closely along the boundaries of passing anticyclones, thus further indicating that at the junctures between HIGHS and LOWS atmospheric irregularities favorable to mirage occur.

It has been seen that in a few favorably located places mirage appears to be recurrent in advance of strong winds, colder weather, and thunderstorms, and that by reason of such associations with ensuing conditions dwellers in these localities regard these optical phenomena as notice of approaching weather changes.

Thus the relationship of mirage to meteorological factors seems to be established. While this does not have the practical importance and certainty in meteorology that attends the relations of atmospheric refraction to the problems of astronomy and navigation, yet it is gratifying to be able, even in small degree, to relate ocean mirage to the general weather situation in which it most commonly occurs.



By CARL JOHNSON
Consulting Engineer

Have you a fire cracker under the hood of your car? I mean the bolts and nuts that swing around when you push the starter. Most of the people today who drive a car have an idea there must be something under there that pulls the wheels around. You also have fire crackers on ships, minus spark plugs and they run on diesel oil instead of gasoline.

Last week I was asked by a friend if he could go with me aboard a ship that had a diesel engine. After we were aboard we were standing on top of the main engine. The cylinder heads were off and the pistons taken to a machine shop for remachining of the ring grooves. Looking down into one of the cylinders, my friend asked me what this hole was for. I told him it was for the piston. His answer was "What in heck are they using a big hole like that for a piston. It is a waste of space." At first I thought he meant they could have a smaller engine with more horsepower or what we call a high speed engine. But after he saw five more empty holes about twenty-two inches in diameter he said, "You won't tell me they are putting pistons in them too." He was then told if he would come around in a couple of hours, West Winds would have those holes plugged, as the plugs were just about ready to leave the shop. And with this explanation our man left happy leaving the responsibility to West Winds to get the wheel turning the next day.

• • •

The purpose of this little column every month will be to bring maintenance tips to diesel engineers that may help to make their engines last longer, and to reduce their operating costs. Questions by readers are welcome; address them in care of this magazine.

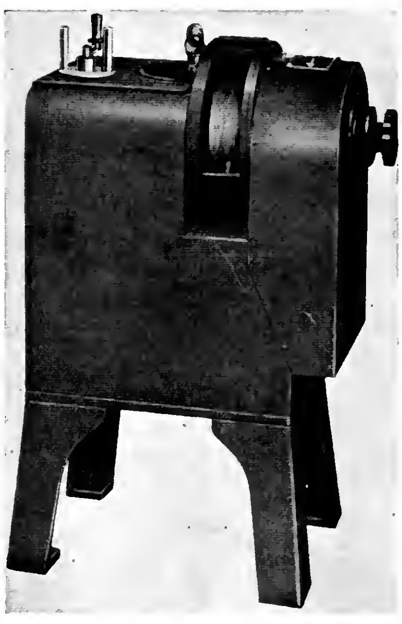
KEEP POSTED

New Equipment and Literature for Yard, Ship and Dock

Electric Sounding Machine

The Kelvin-White Company of Boston recently took over the manufacture and sale of the Lietz Rotary Sounding Device. This machine is capable of taking soundings while a ship is under full speed; it is powered with a 1 HP motor.

Lietz Rotary Sounding Device.



The major features are the construction of the brake and the freely rotating reel, plus the two-speed electric motor switch giving the operator "feel" control in paying-out and reeling-in. A fathom dial is provided of such design that the actual amount of wire out can be easily read. In case of power failure, an emergency handle can be used without disconnecting the motor—the armature acting as a fly-wheel actually facilitating the operation.

Assembly and disassembly of the electric sounding machine are very simple and can be readily accomplished by the ship's crew if necessary. The complete fume and spark-proof housing of all parts gives solidity and strength.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

....issue. Page No..................

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(Identify by name of manufacturer and catalog)

NAME..

BUSINESS..

ADDRESS..

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New Steering Recorder

A new instrument, which automatically and continuously records a ship's course, has been made for the U. S. Navy by the General Electric Company.

The "ship steering recorder" marks the ship's rudder position and compass direction, and calculates any deviation from the set course on a moving roll of paper. G-E engineers say the device can detect an error in course as slight as two-tenths of one degree. Nine of the instruments have been delivered to the Navy for experimental installation in several destroyer and submarine chart rooms.

The steering recorder measures 24½ x 19½ x 14 in. and weighs 160 lb. The record is kept on a 12-in.-wide roll of waxed paper which passes beneath metal points connected electrically with the ship's

General Electric Steering Recorder. Front view oblique from left.

rudder and compass. Running at low speed, the instrument can make a continuous eight-day record without attention.

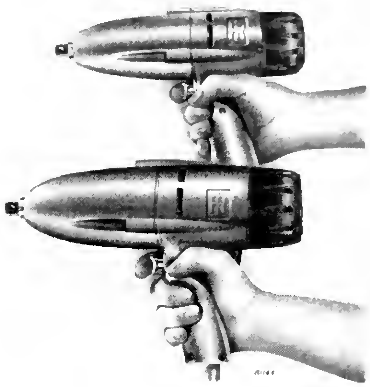
As yet, the recorder is not commercially available and no permanent installations have been made. The Navy is using the instruments at the present time to check the accuracy of experimental "automatic pilots" for ships.

New Heavier Model Impact Tool

Ingersoll-Rand Company announces a new and heavier model of the electric impact tool. It is believed the new model will be especially useful in the marine field for handling the bigger, harder repair and construction jobs.

It will perform the same variety of work as its prototype, but is rated for heavier duty all along the line. With standard accessories it will run and remove nuts up to ⅝" thread size; drive and remove studs; extract broken cap screws and studs; apply and remove machine screws of all kinds; run wire brushes; drill brick, metal, and masonry; tap; and ream. It may also be used for wood-boring.

Known as the 8U, the new tool is 12⅛ inches in length and weighs 9 lbs., 13 oz. It is available for



Ingersoll-Rand impact tool.

either 110 or 220 volt current and operates on AC or DC.

N. L. Rawlings Appointed at Newport News Shipyard

The appointment of N. L. Rawlings as Assistant General Manager of the Newport News Shipbuilding and Dry Dock Company, Newport News, Va. has been announced by J. B. Woodward Jr., President and General Manager of the Company.

Rawlings came to the Newport News Yard in the summer of 1947 as a special sales representative following his retirement as a Rear Admiral in the United States Navy. During his eighteen months with the Company he has handled much of the Yard's foreign business, especially in South America.

N. L. Rawlings
Rear Adm., USN., Ret.

In leaving the Navy, Rawlings closed out a 34 year career of service both in the line and in the Department's top supervisory echelon of ship building, ship repair and strategic construction planning. His World War II duty was largely in the latter capacity, while in the first World War he served with a destroyer flotilla based at Queens Town, Ireland. At that time he was a junior officer just out of the United States Naval Academy, a graduate of the Class of 1917.

For his management and direction of the big San Francisco Naval Shipyard, Rawlings was twice awarded the Legion of Merit during World War II. He served in the early days of the war as head of the Shipbuilding Division of the Navy Department, and between 1942 and 1945 he took over the West Coast yard which handled the major modifications and battle damage repair to naval ships that were carrying the fight to the Japanese.

Rawlings' early training in shipbuilding included the Navy's course of Naval Architecture and Marine Engineering at Massachusetts Institute of Technology in 1921, and his subsequent peacetime assignments have been mainly in the Navy Department's principal shipyards.

His appointment as Assistant General Manager at the Newport News Yard became effective on the first of the new year.

Yangtze River Steamers

(Continued from page 52)

EQUIPMENT SUPPLIERS

Item	*Make*	*Supplier*
Whistles	Clark Cooper Co.	Clark Cooper Co. Palmyra, N. J.
Gaskets	Flexatallic Gasket Co.	Flexatallic Gasket Co. Camden, N. J.
Electric Motors	Electric Tamper & Equip. Co.	Elec. Tamper & Equip. Co. Montreal
Maneuvering Valve	Schutte & Koerting	DeLaval Steam Turbine Co.
Maneuvering Operatin Gear	M. L. Bayard & Co.	M. L. Bayard, Philadelphia
Control Valves	Swartwout Company	Swartwout Company 103 Park Ave., N. Y. C.
High Pressure Valves	Guelph Engineering Co.	Guelph Eng'r. Co. Guelph, Ontario, Canada
Refrigeration	York Ice Machinery Co.	Canadian Ice Mach. Co. Montreal
Air Conditioning	American Blower	Canadian Sirocco Co., Ltd. Windsor, Ontario
Ventilation	American Blower	Canadian Sirocco Co., Ltd. Windsor, Ontario
Main Switchboard Emergency Switchboard	Bepco Canada Ltd.	Bepco Canada, Ltd.
Motor Controllers	Ward-Leonard Elec. Co.	Smith-Meeker Engr. Co., Inc., 125 Barclay St., N.Y.
Automatic Transfer Switch	Automatic Switch Co.	Automatic Switch Co. 41 E. 11th St., N.Y.C.
Alarm Panels	Auth Elec. Co., Inc.	Auth Elec. Co., Inc. 422 E. 53rd St., N.Y.C.
Manual Transfer Switches	Bruno H. Ahlers	Bruno H. Ahlers 89th St., Woodhaven, L. I. N. Y.
Fire Detection System	Walter Kidde & Co.	Walter Kidde & Co. Belleville, N. J.
Circuit Breakers	Westinghouse Elec. & Mfg. Co.	Westinghouse Elec. & Mfg. Co.
Circuit Breakers	I.T.E. Circuit Breaker Co., Philadelphia	I. T. E. Circuit Breaker Co.
Steering Gear Alarm Panel	Bepco Canada, Ltd.	Bepco Canada, Ltd. Montreal
Battery Charging Panel	Bepco Canada, Ltd.	Bepco Canada, Ltd. Montreal
Controller Oil Purifier	General Electric Co.	General Electric Co.
Trough Lighting	Northern Elec. Co., Ltd.	Bedard-Girard, Ltd. Montreal
Voice Tubes		Pilot Marine 29 Broadway, N. Y. C.
Engine Order Telegraphs	Crude Oil Engine and Engineering Co., Ltd.	
Salinity Indicator	McNab	McNab Inc. Bridgeport, Conn.
Power Panels	Bepco	Bepco Canada, Ltd.
Miscellaneous Elect. Equip.		Bedard-Girard, Ltd.
Hull Steel	Cor-ten	U. S. Steel
Superstructure	Aluminum	Alum. Co. of Canada Montreal
Windows	Aluminum	Young Windows of America
Joiner Bhd's & Linings	Aluminum	Martin Parry Co., N.Y. & Fleet Manuf. Co., Ltd. Ontario
Furniture	Aluminum	Martin Parry Co., N.Y. & Fleet Manuf. Co., Ltd. Ontario
Hatch Covers & Cargo Port Doors	Aluminum	Seaboard Mach. Co. 29 Broadway, N. Y. C. & Triumph Continental Products Ltd., Montreal
Steering Gear	Hydro-Electric	McLeod & Callander, U. S. A.
Deck— Machinery Winches Capstan Windlass	Electric	Progressive Eng. Works Co Ltd. Vancouver, B. C.
Life Boats & Davits	Aluminum	Lane Lifeboat & Davit Co. Flushing, L. I., N. Y.
Sounding Boats	Wood	Houde & Bergeron, Canada
Anchors	Baldt	John Leckie, Ltd.
Hawser Reels	Steel	Hall Eng., Ltd.
Elec. Trolley Hoist	Wright Manuf. Co., U. S. A.	Upton-Bradeen & James Co., Ltd., Montreal
Rudder Bearings	Roller Bearings	SKF, Canada
Deck Covering	Lavarock	Federal-Lavarock Co.
Insulation	Fiberglas	
Booms	Tubular Steel	American Mast & Spar Co.
Paints		International Paint Co., Ltd.
Galley Equipment	S. Blickman & Co.	S. Bickman & Co. Weehawken, N. J.

Foreign Tankers

(Continued from page 41)

the correct outward spring pressure. The indications to date are that in many cases the spring pressure is too great and responsible for a certain amount of undue wear when cylinder liners are new and parallel. As cylinder liners become worn and tapered a greater outward spring pressure may be necessary but it would seem that such a pressure is not suitable for new liners.

Until the experimental piston rings have been in use for a longer period it is not possible to express a definite opinion as to the merits of hard rings in respect of cylinder liner wear. The present indication is that 210/275 Brinell Hardness rings have no worse effect on cylinder liners than 180/210 Brinell rings.

All fuel and exhaust valves examined during the second periodical drydocking were in excellent condition and were refitted as taken out. Some of these valves have been in continuous use for 2,000 hours and at no time has it been necessary to change a fuel valve because spray holes were choked or an exhaust valve because the mitre faces were burnt. The valves are changed as a matter of routine and as a rule the fuel valve nozzles are cleaner and the exhaust valve faces pitted to a lesser extent than would be the case were the engine operating on Diesel fuel.

The frequency with which the centrifugal purifier and clarifier needs to be opened up and the separated matter removed from the bowls depends upon the source of the fuel shipped, but the average is once per 24 hours. This entails about half-an-hour's work. The engine room is in spick and span condition and there is nothing to indicate

(Please turn to page 96)

S. F. Propeller Club

Left: American President Lines table at November meeting of San Francisco Propeller Club. Left to right: H. B. Luckett, assistant to president; W. K. Varcoe, freight traffic manager; Edgar Wilson, vice president, Southern California office; M. J. Buckley, senior vice president. Mr. Wilson, head of American President Lines' Los Angeles offices, was Guest of Honor.

Below: November meeting of San Francisco Propeller Club presided over by K. C. Tripp of Moore McCormack.

Anchor Equipment Expands

The Anchor Equipment Company of Pier 3, San Francisco, announces the addition of several features of interest to the industry. To more thoroughly serve the valve field, Anchor has recently purchased the entire stock of the Standard Supply Co., and has added a second warehouse for the purpose of maintaining adequate stocks of Edwards, Crane, and Kennedy Valves.

The firm has been named marine jobber for Worthington Pumps, and will henceforth carry their pumps and spare parts in its Pier 3 warehouse, along with a very complete line of American Hammered Piston Rings, in sizes from automotive to Liberty ships.

Other nationally known products stocked are Helwig-Spear Carbon Brushes, and Gotham Instruments. Anchor carries the Gotham line of marine and industrial thermometers, dial, pressure and thermo controllers of all types. Because the Gotham Co. operates a glass-blowing factory on the Pacific Coast, repair work and delivery of new instruments is greatly facilitated.

Since 1947, when T. S. Jerstad and A. H. Scurfield formed the company, the speed of its growth has been outstanding. This has been attributed by the partners to their emphasis on superior service and the selection of a sales force familiar with the problems of the marine and industrial field. Both partners sailed as Marine Engineers and Chief Engineers for many years prior to the war. Alan Scurfield served as a Commander in the Navy during the war and came ashore to manage the Charles E. Lowe Co. Ted Jerstad was Homml-Dahl representative for maritime installations during the war, servicing these for the W. T. Mayer Co. Prior to the formation of Anchor Equipment, Jerstad was Sales Manager for Terco Equipment.

Sam Nelson, Purchasing Agent, spent seven years as a Naval officer and six years with Bethlehem Steel, including the war period. His assistant, John O'Loughlin, came to Anchor from the Charles M. Bailey Co. Sales Manager Dick De Berry was formerly with American-Hawaiian. Salesmen Hugh Pennebaker and John Rodgers both sailed as marine engineers, and Hugh was shoreside with Pacific Tankers as engine room buyer. Edward McElroy, who is Service Engineer for the firm was with Charles Lowe for many years and more recently operated his own supply company, specializing in servicing pumps and engine parts.

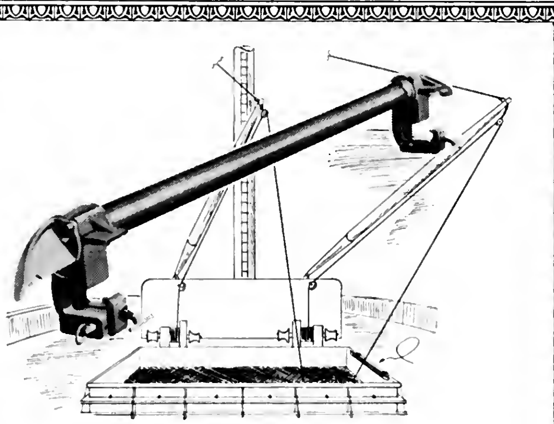
Merchant Officers Eligible For Naval Reserve Commissions

Merchant Marine officers who wish to apply for commissions in the Merchant Marine Reserve of the Naval Reserve, may be accepted by the Navy irrespective of their draft status.

In making this announcement, the Navy considers as eligible all deck and engineering officers presently aboard Merchant Marine ships.

Applicants must be citizens, physically qualified, and may not be members of any other branch of the Armed Forces or pensioners.

Merchant Marine officers interested should write or come in person to Captain Frank Wauchope, USNR, Merchant Marine Reserve Officers, Twelfth Naval District, Room 33, Federal Office Building, San Francisco.



Combustion Engineering and Superheater Merge

Merger of two well-known power equipment manufacturers—Combustion Engineering Company, Inc. and The Superheater Company—was consummated on December 22 by approval of the stockholders of both companies. It became effective on December 31, 1948, under the new name of Combustion Engineering-Superheater, Inc.

The orginal Combustion organization was founded in 1914, its products including Type E, Type H and Coxe stokers. Subsequently it absorbed other manufacturers of fuel burning equipment and several boiler companies, the latter including the manufacturers of Heine, Walsh-Weidner, Casey-Hedges and Ladd boilers. Two of these companies started in the field in 1884, and several others were organized prior to 1900.

The Superheater Company was organized in 1910 as the Locomotive Superheater Company, designing and building superheaters for locomotive boilers. Later, it expanded its line of products for locomotives and developed superheaters and other equipment for power plant boilers as well as marine and oil-country boilers.

Following World War I, both Cumbustion and Superheater were identified with major new developments in steam generation. Combustion was chiefly responsible for the commercial development of pulverized coal firing of boilers, water-cooled furnaces and completely integrated designs of steam generating units. Superheater pioneered in the development of superheater designs for higher steam pressures and temperatures. Both companies were identified with many of the installations which in the period from 1920 on set new standards of practice and performance.

Domestic manufacturing plants owned by the two companies occupy some 115 acres and are at Monongahela, Pa.; Chattanooga, Tenn.; Chicago; East Chicago, Ind.; and St. Louis. Plants operated by subsidiary companies are located in Canada, England and France.

The companies do business outside the U. S. A. through representatives in the principal cities of Latin America and the Orient and through the following subsidiaries: The Superheater Company, Ltd., Montreal; Combustion Engineering Corporation, Ltd., Montreal; Combustion Engineering de Mexico, S. A.; Combustion Engineering Limitada, Brazil; The Superheater Company, Ltd., London; The Superheater Company, Pty., Ltd., Sydney; Compagnie des Surchauffeurs, Paris; and Stein et Roubaix, Paris.

The two companies became affiliated in 1933, and since then it has become increasingly evident that important advantages could be obtained by merging all operations under a single management. The new company will continue the world-wide activities of the present companies in the manufacture and installation of steam generating and associated products, and such equipment as chemical recovery units for pulp mills; flash drying systems for a wide variety of materials; sewage incineration systems; mills for pulverizing products of the process industries generally; soil pipe and castings; domestic water heaters; and range boilers.

Officers of the new company are: Frederic A. Schaff, Chairman of the Board and Vice Chairman of the Executive Committee; Samuel G. Allen, Chairman of the Executive Committee; Joseph V. Santry, President; Martens H. Isenberg, Executive Vice President; Harold H. Berry, Vice President in Charge of Finance. Vice Presi-

ents: Wilbur H. Armacost, George D. Ellis, Amaziah Moses, John S. Skelly, Otto W. Strauss, Donald S. Walker, Albert C. Weigel, Arthur Williams. Secretary nd Assistant Treasurer, Irving B. Swigart. Assistant ecretaries: Thomas F. Morris and Francis J. Dolan. ssistants to Chairman: Thomas F. Morris and Frank . Fitzpatrick.

00,000 Miles on San Francisco Bay

A veteran of 200,000 miles on water, all on San Franisco Bay, is John O. Heino of San Rafael, who made he record in his 27 years with the Army marine service. Heino has now entered terminal leave preliminary to etirement. At the time of his retirement he was captain f the USHB *El Aquario,* one of the Port's harbor boat leet.

From the time Heino joined the service in 1921 to is recent retirement, he served on only two boats, the *El Aquador* and the *El Aquario.* These two harbor boats vere used chiefly in transporting water and supplies to Fort McDowell, Angel Island, and Alcatraz Island. Logs n the Port Marine Superintendent's Office show they overed an average of more than 600 miles a month in heir daily trips between Fort Mason and the Bay Islands.

At the other extreme is Allan Erickson of San Francisco, also retiring from the Army marine service, who has sailed ships on every ocean and to every continent during his service. He, too, joined the Army marine service in 1921, and at the time of his retirement he was master of the USAT *General Hugh Gaffey,* one of the Army's largest P-2 Class transports.

Propulsion Diesel Engines

(Continued from page 74)

and few parts were stocked. During World War II, stocking distribution centers for parts were established. The Naval Supply Depot, Mechanicsburg, Pennsylvania, devised usage statics on an "automatic flow system" for repair parts. Parts were procured on a prearranged schedule and shipped from distribution centers to using activities, without prior request from using activities. To shorten supply lines, two major distribution centers were established in the United States, with eight subsidiary distribution centers throughout the world.

Postwar developments in Diesel engines are continuing. A recent development of a cylinder head for the Navy Standard DB engine, accomplished by the Norfolk Naval Shipyard, has increased engine power 41 per cent and at the same time lowered fuel consumption 19 per cent. An aluminum version of the General Motors 6-71 engine has been delivered to the Navy and is undergoing tests. An aluminum version of the Navy Standard DA engine has also been tested. The U. S. Navy is interested in light weight, compact engines and is having developed a 105 horsepower engine which promises to be considerably lighter than any existing engine in use. Though the engines that are being developed are made lighter and more compact no sacrifice of reliability is permitted. The Navy is continuing its lead in Diesel development.

Tanker Authority

Known internationally as a designer of ocean-going tank vessels is E. L. Stewart, manager of the Marine Department's Construction and Repair Division of Standard Oil Company (New Jersey). Stewart has been with the Marine Department of Standard Oil since 1920 when he began work as Assistant to the Naval Architect of the Construction and Repair Division. Since then he has had a part in the design of every ship built for the company

E. L. Stewart

and its subsidiaries and affiliated companies, domestic and foreign.

In less than a year after joining Standard Oil, Stewart was promoted to Naval Architect and continued in this post until he became Manager of the Construction Division in 1940. In 1945, when the functions of construction and repair were again combined, Stewart was appointed to his present position.

Before joining Standard Oil, Stewart was with Bethlehem Shipbuilding Corp., San Francisco, as Hull Draftsman and Apprentice to the Assistant Chief of Bethlehem's Hull Department. After eight years there he served as Naval Architect for the San Francisco Shipbuilding Company, taking part in the immense program of ship construction during World War I. In the postwar period he was hull surveyor for the American Bureau of Shipping.

Hear! Hear!

Sounding its whistle all the time, a whistle buoy marking the station of Nantucket Shoals Lightship broke loose and drifted for 19 months, circling between Bermuda and the Atlantic coast—covering a distance of at least 3,300 miles.

German Use of Hydrogen Peroxide

(Continued from page 45)

name of the U. S. general commanding that area whose headquarters was in Munich, Munich being about 400 miles away. Telephone communications were very deficient and in addition I realized it would be too easy for the general to tell me no over a telephone even if I could get him on it. I, therefore, drove to Munich and bearded him in his den. He was extremely cooperative after I had explained my problem and the reasons in connection with obtaining the coal. He gave me a slip of paper authorizing the Army forces in Pilsen to obtain the coal to transport it for me to Dr. Mundt in Marktredwitz. I then returned to Pilsen and got the coal delivered into Germany.

My next task was to get the potassium chromate which I expected to be available in Darmstadt at the Merck Company. Enroute we stopped overnight in Nuremberg. Next morning we left at daybreak as usual and had proceeded only a few blocks when we were stopped and our papers examined very carefully. We proceeded only a few blocks further when the same procedure took place. A third time the same routine occurred. I asked the sentry what was happening, and he said he had no idea, but he was aroused at 2:00 A.M., given breakfast, furnished instructions to stop all German traffic past his post and to carefully scrutinize all other traffic. We proceeded on our way all day and were stopped well over a hundred times. After awhile I had one sentry write in chalk on the jeep, "U. S. Navy Jeep—all papers have been examined this date and found in order", and signed it. From then on we were cleared at the hundreds of control posts which had been set up early that morning. We were almost the only vehicle moving on the roads. All others were U. S. Army and very few of them. I found later that the entire American occupation zone had been frozen so far as movement of any German people were concerned and that every house in the entire European Theatre had been throughly searched that day. I was told that considerable German contraband had been discovered and that a fairly large number of important Germans who were in hiding had been found and identified and incarcerated. On completion of this task of locating and procuring all various parts to complete the modern H_2O_2 engine I returned to Kiel and had the older model engine throughly tested and data recorded and analyzed.

Upon re-entering Kiel I was completely amazed at the transformation which had taken place during my short absence. Practically all the rubble in the streets had been carted away. There were streetcars running, electric lights installed and the water supply and sewage system was intact. After seeing this transformation and thinking about how it took place it was rather easy to understand because every German man, woman and child was at work practically all the time between daylight and dark.

Upon completion of the engine tests at Kiel, I returned to Paris and had my reports completed in their final form and forwarded to the Navy Department for distribution. I then went to England on some business I had with the Admiralty. I intended to return home by Army Transport Corps plane through Prestwick, Scotland and Iceland, but at the last minute came back by Paris and Naval Air Transport. I was in both London and Paris on Friday, August 10, when the false VJ Day was celebrated and was in Washington for the real VJ Day, so I am the only person who saw VJ Day celebrated in all three capitals. The army plane I expected to take was lost with all hands between Scotland and Iceland.

New Sperry Loran

A new loran receiver-indicator using miniature tubes has been put into quantity production by Sperry Gyroscope Company, Great Neck, New York. Of compact design, the long-range, electronic navigational equipment may be shelf, table or deck-mounted. Commercial deliveries are scheduled for early spring.

The direct-reading feature, developed and first introduced by Sperry in the Mark 1 loran, has been retained.

The Mark 2 loran incorporates six important improvements: its small size and use of separate power unit suits it to vessels with limited space; trunnion mounts permit tilting of the receiver-indicator to suit the operator; large numbers make the time-difference meter easy to read; motor driven phase-shifting circuit plus continuous coarse and fine delays simplifies and speeds operation; an automatic frequency control keeps the pulses locked on the operating portions of the sweeps; "black light" illuminates panel without interfering with night vision.

Sperry has already received contracts for 175 Mark 2's for the Army Transport Service and 20 for the Coast Guard. Officials of the company predict a marked increase in loran sales in 1949 to a variety of deep sea operations. Interest among fisherman is growing. They have found it an invaluable aid in locating and returning to profitable fishing grounds in any weather.

With loran, skippers within range of shore-based transmitters accurately fix their positions at sea in less than five minutes independently of celestial observations.

New Sperry Mark 2 Loran can be table-mounted as demonstrated by Capt. W. R. Griswold who tested the device at sea aboard Sperry's floating laboratory M.V. "Wanderer."

Magnesium Ladders By Aluminum Ladder Co.

The Aluminum Ladder Company, Worthington, Pa., has developed a new line of magnesium ladders for general industrial purposes. The company will continue to manufacture marine and fire department ladders of aluminum, as well as certain industrial types.

Magnesium weighs approximately two-thirds as much as aluminum; and light weight, for easy handling and storage of ladders, has been one potent reason for the success of the Aluminum Ladder Company during the past 18 years. Another has been the industrial alertness of the company's president (and founder), S. H. Carbis.

In extensive tests, the new magnesium ladders have compared very favorably with their aluminum prototypes. Fabricated from a new alloy exhibiting the most satisfactory combination of rigidity, strength, corrosion resistance and wearing qualities, these ladders are as light and sometimes lighter than similar aluminum ladders. Like aluminum, they are spark-proof.

Following the same designations as the aluminum ladders they replace, the new magnesium ladders include step ladders of all types, platform and warehouse ladders, and light and heavy duty extension ladders.

Marine Insurance

(Continued from page 57)

to or from any port in the United States shall exercise due diligence to make the vessel seaworthy and properly manned, equipped and supplied, the vessel, her owners, agents or charterers shall not be held liable for damage or loss resulting from faults or errors in navigation or management."

Although this act was passed primarily to benefit American shipowners, the foreign shipowners are also allowed the benefits of the act and are subject to its burdens when their ships trade to our ports.

Who Likes Figures?

(Continued from page 59)

now arises, whether by multiple involution we reach any further mathematical operation. What if we have (Fig. 5). This can be rewritten as shown. And in general we can say, (Fig. 7). That is, a power a^b is raised to the *nth* power by multiplying the exponents. In like manner, (Fig. 8). Therefore, multiple involution leads to no further algebraic operations."

"Multiple multiplication is involution. Multiple division is evolution. Involution uses the exponent. Evolution uses the radical and its numerical index (Fig. 9). "A fraction like a/b times c means to multiply c by a and to divide the result by b. Perhaps we can have both involution and evolution at the same time in the same expression and have a fractional exponent. If it could be a fraction, then surely it could be a decimal. It is evident from the previous conclusions that, (Fig. 10), and in general the numerator of a fractional exponent is the power and the denominator is the radical index of a number. Furthermore, by similar logic we have, (Fig. 11)."

Frank stopped for a minute. McCoy and Campbell were silent. Bill Clark, the philosophical First Assistant, opened his mouth a moment, then slowly drawled, "Well I guess that will hold you fellows a while. That's all pure logic. Now try to get some logic in the log sheets you turn in."

The oiler on watch knocked, entered hat in hand, "Sir, its 2330 and the midwatch is being called. Everything's all OK below except that the salt figure in the for'd engine room is still up a little."

"Yeah Bill, let's see you try some of that newfangled logic on the salt leak below. Its your watch at 0800, I believe." It was of course sour Mac McCoy who had his last say.

As they broke up, young Campbell spoke to Frank. "Please, Mr. Farran, tell us about logarithms next time. The mates use them but will not or cannot tell me where they come from."

"We'll see when the time comes." Frank turned away and left for his room.

Capt. H. J. Andreassen

New Marine Electric Supply Co. Formed

Recently organized is a new corporation, Andreassen and Company, Inc., which has purchased the business of the San Francisco Branch of Owesen and Company, Inc. Located at 105 Front St., San Francisco, this new and independent corporation is owned and operated by the same men who built up and managed the San Francisco Office of Owesen and Company, Inc. The formation of the new company is calculated to handle more efficiently the growing needs of this area as far as electrical supplies and service are concerned.

Captain H. J. Andreassen becomes President of the new concern, Mr. S. A. Enger, who has purchased the stock of Colonel Oliver Vickery, becomes the new Vice President. Colonel Vickery has been elected President of Owesen and Company, Inc. of New Orleans, and continues a member of the Board of Owesen and Company, Inc. Colonel Vickery will make his headquarters in San Francisco in the Owesen Building.

Descendant of a long line of shipping people, Captain Andreassen first went to sea in 1926, and obtained his Master's license at the age of 21, becoming the youngest skipper, not only with the A. O. Andersen Shipping Company, but in fact, in the entire Norwegian merchant fleet. Captain Andreassen, who saw plenty of wartime action, came ashore in 1943 to join Owesen and Company, Inc.

The firm handles lines of Westinghouse, General Electric, and other major electrical manufacturers and is exclusive distributor for various shipboard electric items. Newest addition to the corporation's facilities is a completely fitted out repair department under the supervision of the well-known Pete Hansen. Fred Macy is purchasing agent and James Scott is sales manager.

Robert E. Wallace Is Partner in Chubb's

Robert E. Wallace, manager of the Pacific Coast Department of Chubb & Son, was recently made a partner in that insurance underwriting firm. He joined the organization in 1926 and has been in charge of agency relations and business development prior to his present assignment. Wallace was a vice president of the affiliated Vigilant Insurance Company for several years and was elected vice president of the Federal Insurance Company last year.

Robert E. Wallace

Daniel Roberts Heads List of National Lead Appointments

Three executive appointments have been made in National Lead Company's Pacific Coast Branch.

Daniel D. Roberts has been named branch manager, succeeding James L. Caruth, who died on December 23. He was formerly the manager for the Portland Division of the west coast branch.

C. A. Sondhaus has been appointed assistant manager of the branch. He was director of industrial relations before the appointment.

K. C. Specht, formerly assistant manager of the Southern Division of the Pacific Coast Branch, has been named manager. He succeeds H. S. Irwin, who retires at the end of the year.

OBITUARY

Charles E. Stewart

Richard J. Ringwood

Charles E. Stewart

Charles E. Stewart, architect and marine engineer, died November 23 at his home in El Cerrito, California.

Born in Greenock, Scotland, Mr. Stewart served his shipbuilding apprenticeship in Caird's of Greenock and later studied Naval architecture at Glasgow University. He came to America in 1910 and served as assistant superintendent of hull construction in the early days of the Federal Shipbuilding Company in Kearney, New Jersey. He served as marine engineer for the State of New Jersey, and later was with the Henry J. Kaiser plant in Portland, Ore., as head loftsman. The U. S. Maritime Commission appointed him as principal hull inspector for the Richmond, California, shipyards in August 1941 and he remained there until the shipyards were closed, when he was transferred to the San Francisco office.

Richard J. Ringwood

Richard James Ringwood, a well-known figure in the Pacific Coast shipping industry, died January 5 in Paso Robles where he had been living since his retirement two years ago as freight manager on the Pacific Coast for the Panama Pacific Line and the Coastwise Lines.

A native of San Francisco, he went to sea as a boy and became a purser, before going ashore just before the turn of the century.

Serving with Pacific Coast Steamship Company for nearly twenty years, he resigned as vice president and general manager in 1917 to go into business for himself. In World War I he was in charge of French High Commission ships on the Pacific Coast and later was placed in charge of operations for the shipping board at Washington.

Dick was a long-time friend of many in the shipping industry, among the first of whom was M. J. Buckley of American President Lines. They joined the Family Club together 40-odd years ago and were together in the club from that time on.

Foreign Tankers

(Continued from page 84)

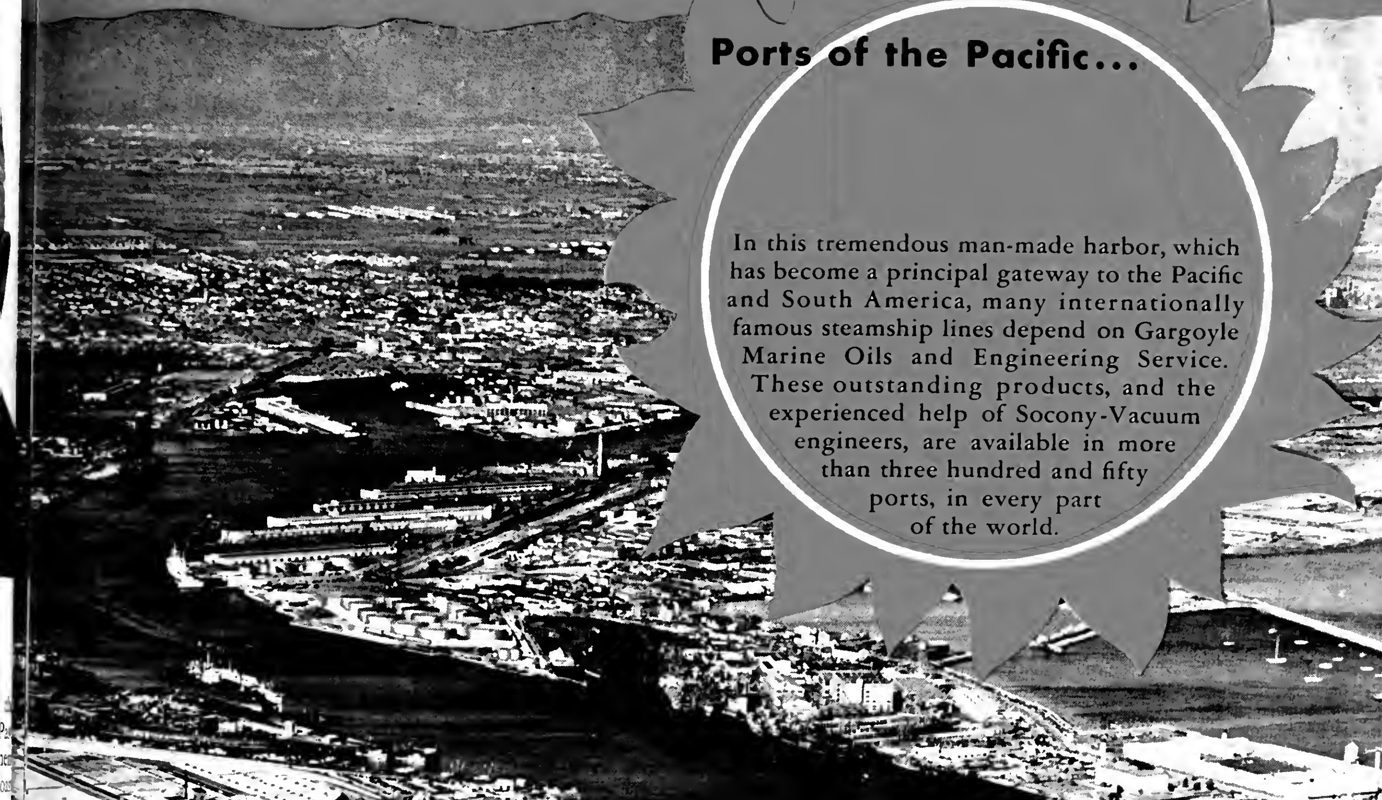
that the engine is being operated on boiler fuel.

The ship enters and leaves ports regularly and on no occasion has the engine failed to answer a bridge order with a certainty and promptitude that satisfies the most fastidious pilot. At many of the loading ports no tugs are available for berthing, and Stanlow, on the Manchester Ship Canal, is visited frequently. Conclusive proof of the reliability of the *Auricula's* engines is to be found in the Master's anxiety lest he should not be sent back to the ship after his annual furlough.

Other tankers of the Anglo-Saxon Petroleum Company are operating with equal success on boiler fuel, and conversions are being carried out as quickly as the purifying equipment can be procured.

Pacific MARINE REVIEW

EBRUARY, 1949



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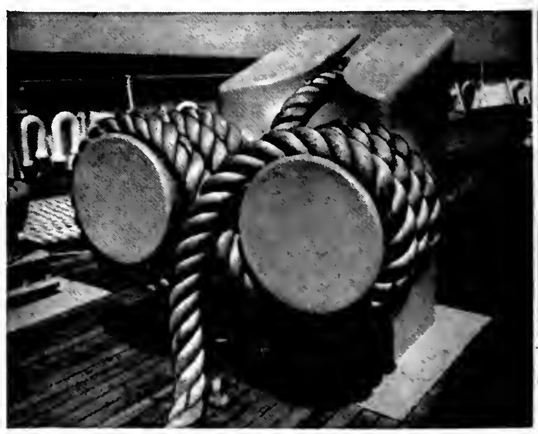

There is no Finer Rope

1600 Ships Will Need Replacement

EVER see an orchard in midwinter? Or a farm after its productive season is past? That is the sort of doleful aspect which the layman and the newcomer to the industry sees in shipbuilding's future. The wise shipbuilder, like the knowing farmer, sees another day ahead and understands that the doldrums do not constitute the great sea. More ships will be built.

There were, as of a month ago, 1201 privately owned vessels in the American merchant marine and 387 more on bareboat charter or general agency. It may be assumed that there is need in today's merchant service for some 1600 ships. As the present fleet outlives its usefulness, or as progress in naval architecture and engineering make it necessary, these 1600 ships will be replaced with new construction. The almost clock-like regularity with which fast new European built-for-the-route ships are appearing on this range will in itself freshen our replacement consciousness, and the finely detailed story of the condition of the old *Lurline* before reconversion should be a reminder of the effect on a ship of time and tide.

The replacement of tonnage is not to be considered in the same category as before the 1936 Merchant Marine Act. Economic factors involved in the government's participation in ship financing are now to be reckoned with, and they should bring cheer to the industry. Especially so, if the program now being urged is adopted.

The present "turn-in" age of a ship whose purchase is financed by the Maritime Commission is 17 years. The proposal of the National Federation is for a 12 year life, with a fair replacement valuation. When it is realized that some of our ships are already 10 years old, and that the average age is 7 years, it will be seen that plans for replacement should be just over the horizon. The proposal for a 12 year replacement age is offered in response to President Truman's request for a ship construction program.

That the suggestion for early planning is not premature is emphasized by the fact that of the 1201 active, privately owned ships, 190 are Libertys and Victorys. The Internal Revenue Bureau last year authorized amortization charge-off for Libertys at the end of 5 years, and most of them are now at least that old. Of the 387 ships on bareboat charter and general agency agreement, a large proportion are of the Liberty and Victory types. And of the 1846 vessels in lay-up fleets, 90% are Libertys, Victorys, and large tugs.

It would seem that the Maritime Commission's "prototype" plans, which should be in circulation this month, will come none too soon.

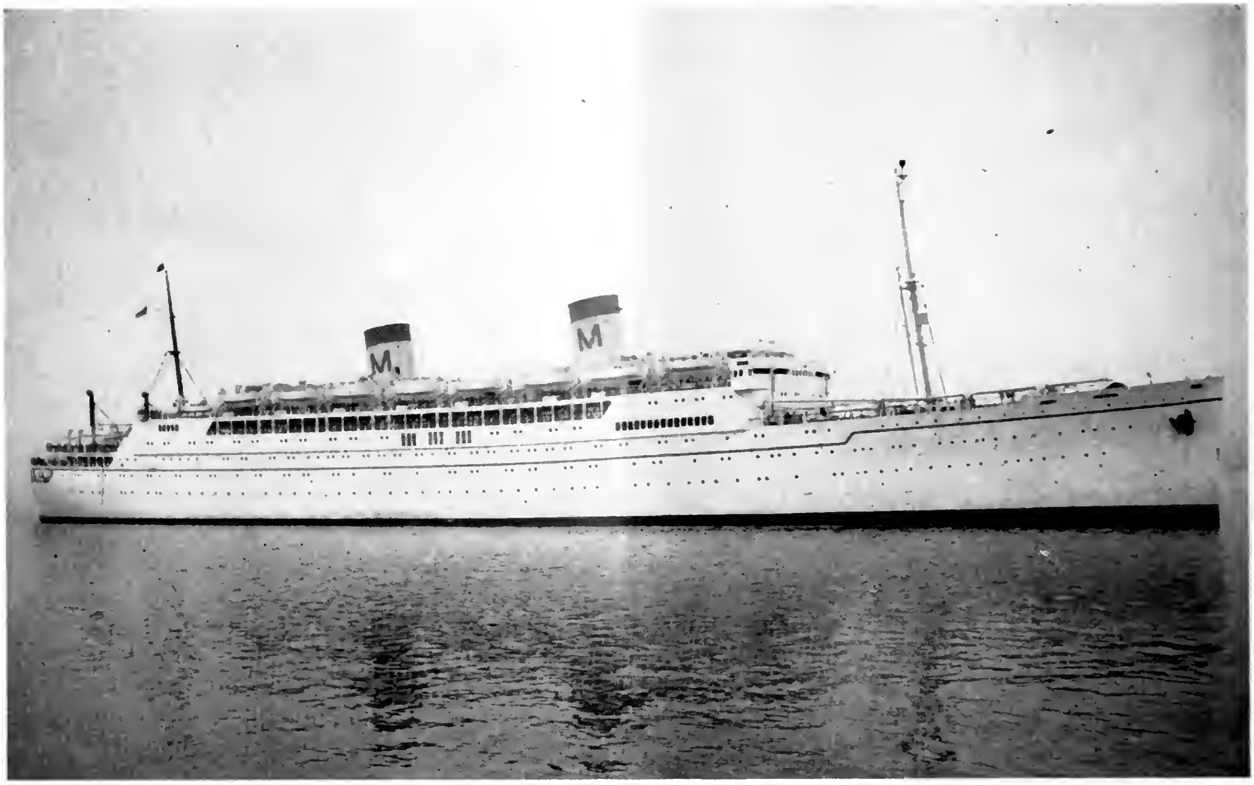

Fig. 1—Profile of the "Lurline" after completion of reconversion in 1948.

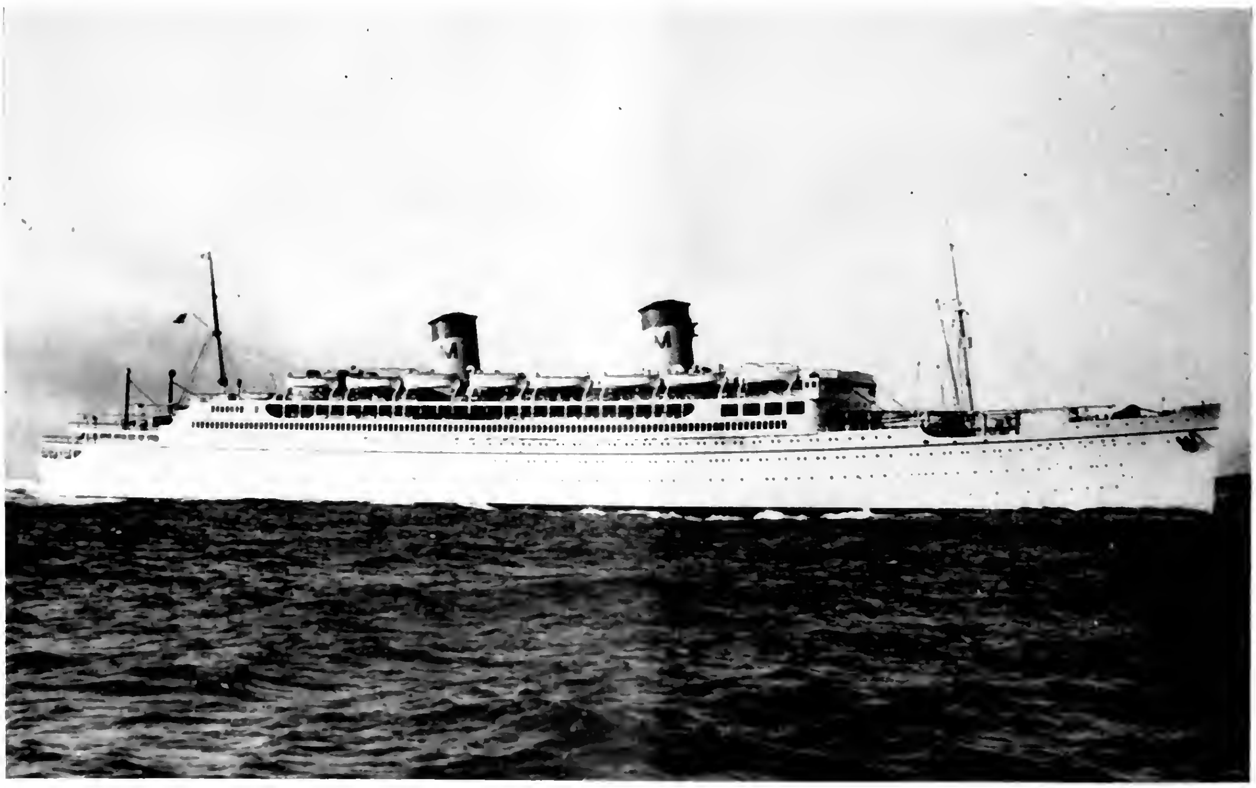

Fig. 2—Similar view of sister vessel indicating appearance in profile before reconversion.

The Spring Meeting of the Naval Architects and Marine Engineers

DEPARTING for the first time from its usual custom of holding its meetings in the East, the Society of Naval Architects and Marine Engineers is holding its 1949 Spring Meeting in San Francisco's Palace Hotel May 12 and 13. Important officials of many companies are to be in attendance, and photographs of a number

George Crow of General Electric Co., Chairman of the Steering Committee for the Northern California Society.

of them will be found spotted throughout this issue of the *Pacific Marine Review.*

The program for the session is in the hands of a steering committee representative of the three Pacific Coast Local Sections. Scheduled are a technical session, inspection trips, social events, and women's activities.

The following papers will be discussed at the session arranged for Thursday morning, May 12. They are printed, in whole or in part, on the following pages.

"RECONVERSION OF LINER *Lurline*"
By Robert Tate of Matson Navigation Co.

"FIRE FIGHTING ON SHIPBOARD"
By Captain Harold J. Burke, USNR,
of C-O-Two Fire Equipment Company.

"THE AUTOMATIC STEERING OF SHIPS BY PROPORTIONAL CONTROL"
By Leonard I. Schiff, Professor of Physics at Stanford University, and Marvin Gimprich, Technical Consultant for the Experimental Towing Tank of Stevens Institute of Technology.

An informal banquet will be held on Thursday evening at the Palace Hotel. This will be presided over by John B. Woodward, Jr., President of the Society, and President of the Newport News Shipbuilding and Dry Dock Company.. Dr. Lee A. DuBridge, President of the California Institute of Technology, will speak on "Science Goes to Sea."

This meeting has been planned with the object of affording members an opportunity to inspect the government and privately owned facilities in the vicinity. Accordingly, a visit will be made to the San Francisco Naval Shipyard and private shipyards, together with a trip through the Radiation Laboratory of the University of California. In order that the marine facilities in the neighborhood may be seen, a cruise on San Francisco Bay has been arranged.

On the lighter side, a golf tournament at the Meadow Club is scheduled, together with a tour of the Muir Woods to see the renowned giant redwood trees of California. The meeting will conclude with a social

John B. Woodward, Jr., President and General Manager, Newport News Shipbuilding & Drydock Corp., President of the Society.

hour and dinner at the Meadow Club located on the slopes of Mt. Tamalpais in Marin County.

This is one of the most extensive Spring meetings ever planned by this fifty-seven year old marine technical society. For the benefit of the members from the East and the Middle West, a special tour was arranged. Special Pullman cars were reserved starting from Albany, Boston, Cleveland, New York and Washington. Upon arrival in Chicago, members travelled by special buses to the Edgewater Beach Hotel for a get-together breakfast, with a tour of Chicago thereafter. At the next stop, Denver, a luncheon and dinner were arranged for the one-day stopover and a tour of the immediate vicinity. The next day a five-hour stop was made at Colorado Springs, with breakfast at the Broadmoor

Hotel and a tour of Cheyenne Mountain. On Wednesday, May 11, the group arrived at San Francisco where a tour of the city was arranged for the afternoon hours.

For the return trip, the members will stop in Los Angeles, at the Biltmore Hotel, with a visit to Santa Catalina Island; a one-day stopover at the Grand Canyon, and then an afternoon at Santa Fe. Arriving back at Chicago, the group will tour another section of the City and then hold a farewell luncheon at the Drake Hotel before departing for their respective destinations.

History of the Society

By H. P. STEWART
Chairman, Northern California Section

H. P. Stewart

The Society of Naval Architects and Marine Engineers was organized in 1893 to promote the art, science and practice of Naval Architecture and Marine Engineering, commercial and governmental, in all their branches. The original group who formed the Society were all officers of the Construction Corps, United States Navy, and were headed by the late Admiral David W. Taylor.

From 397 in 1893, The Society has steadily grown until today its membership totals approximately 5400, representing most of the leading Naval Architects and Marine Engineers, ship operating executives, and executives of marine equipment organizations in this country, and many important men in the profession from foreign countries.

Hundreds of technical papers, which have had an important influence on the development and progress in shipbuilding practice in connection with both Government and commercial vessels, have been presented at meetings of the Society during the last 57 years.

In 1893, when the Society was organized, steel shipbuilding in this country was comparatively new. In fact, approximately 65 per cent of the United States merchant tonnage was of wood and of this wooden tonnage over 50 per cent was driven by sail. The history of the Society, therefore, is closely allied with the period of the industry's greatest advancement, not only in the design of vessels but also in the improvement in types of propulsion and other equipment pertaining to a ship.

In addition to the numerous papers which are included in the annual bound volume of the transactions of the Society, it has sponsored a number of authoritative books, which include "Principles of Naval Architecture", "Marine Engineering", and "The Shipbuilding Business in the United States of America". These books have been particularly useful to the industry during World War II and in the developments arising from the lessons learned during that conflict.

An endowment fund, created in 1914 from surplus funds of the Society and contributions, has grown to a total of over $700,000. The income from this fund has been used for a number of worthwhile purposes. These include the publication of technical books, graduate scholarships for deserving students for special courses in Naval Architecture and Marine Engineering, the award of medals and prizes, and research of several kinds.

The most recent development has been the organization of the Technical and Research Committee, composed of the ablest technical men from the membership, and divided into three sub-committees under the guidance of a steering committee. These sub-committees are currently investigating and studying several projects which, when completed, will become valuable additions to the knowledge of the industry. The results of these studies are being distributed from time to time in the form of bulletins which are available to all interested parties.

In 1941, the first local section of the Society was formed in Philadelphia and was so successful that eight other local sections have been established in maritime centers. These sections are Chesapeake, Great Lakes, Gulf, New England, New York Metropolitan, Northern California, Pacific Northwest and Southern California. These local sections conduct meetings and synposia where papers and discussions on the latest problems in naval architecture and marine engineering are presented. This activity has been most helpful in spreading the influence of the Society in all sections of the country.

The Northern California Section, which meets in San Francisco, and is 1949 host to the Spring Meeting of the National Society, was chartered in 1944 with a membership of approximately 153. This has grown steadily until today it stands at more than 250.

The Society is interested in having able young men join as Junior Members in order that their association with experienced men in the field may develop them to take over the creative work so important to the future of the Shipbuilding Industry.

Reconversion of Liner "Lurline"

By ROBERT TATE

AT THE END of World War II every privately owned American flag seagoing passenger vessel, whether taken over and operated directly by one of the branches of the Armed Services or operated under charter agreement by commercial interests for the Government's account, had been modified physically from its original peacetime form in order to permit efficient wartime operation. Installations of ordnance, plastic armor, degaussing, troop berthing and messing facilities, blackout attachments, life-saving equipment, and similar wartime accoutrements had been added over a four-year period in "converting" these former passenger carriers to their primary war mission as troop transports. Addition of these facilities usually was preceded by the removal of most of the portable and some of the fixed and semi-fixed furnishings to shoreside storage, to other use, or to scrap. During the war period, due to the terrific pressure for troop movements, maintenance of vessels of this type was reduced to the absolute minimum necessary to prevent breakdown. A considerable amount of wanton destruction had occurred as the outcome of a war-tempered attitude on the part of a great group of humanity which had become accustomed to living from day to day with little thought for the preservation of property. This destruction ranged from such acts as initials carved with bowie knives in teakwood rails and gold leaf torn from decorative columns by the pistol butts of passing sentries to machinery and structure damaged and abused by the careless war-trained operator who never would be able to think of the ship or its machinery as entitled to the care and thoughtfulness usually accorded by those who go to sea as a lifetime occupation.

The term "reconversion" in the strict interpretation has come to be applied to the general overhaul, repair, and refitting of a vessel after wartime service so as to place it in its original peacetime condition with all the war damage and war changes eliminated. However, in many cases, and particularly with large passenger vessels, it was neither possible, desirable, nor permissible that the vessel be refitted in its original form. A number of factors combined in most cases to dictate exactly what course the refitting of these vessels would take, and each "reconversion" in its final form developed its own individual characteristics.

It is the purpose of this paper to describe, and to record historically, the details of one of these postwar reconversions, that of the Matson Navigation Company's liner *Lurline*. This reconversion, both from the standpoint of the scope of work undertaken and the financial outlay involved, was the largest single undertaking of the sort on any American merchant vessel. The author will endeavor to describe the *Lurline* project as complete and

Robert Tate

The Author

Robert Tate is assistant to the vice-president of Matson Navigation Company, San Francisco. He graduated in naval architecture and marine engineering at the Massachusetts Institute of Technology in 1932. He served at sea and ashore with the Isthmian Steamship Company until 1939 when he joined the American Bureau of Shipping briefly as a surveyor. In 1940 he became associated with the Construction and Repair Department of the Matson Navigation Company. From 1941 through 1945 he served in the Navy in design and construction phases of the Fleet Tug, Submarine Tender, and Landing Ship Dock programs, as trial board officer and later as Officer in Charge of Minecraft Maintenance, U. S. Pacific Fleet, with additional duties as consultant to the Fleet Salvage Officer. At the end of the war he returned to the Matson Navigation Company where he has been engaged principally in the project described in this paper.

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representative in itself; and no attempt will be made to compare it in any of its phases with work performed on any other vessels, except that in a few instances reference will be made to minor engineering variations developed on two sister vessels* whose reconversion has been partially completed. In addition to describing work performed, the author will endeavor to point out changes and improvements accomplished which contrast the reconverted vessel with the prewar vessel and also to point out the factors which influenced or compelled the owners in their decision to carry out these changes.

Although the opinions expressed in this paper are those of its author, the project described represents the combined effort of numerous individuals and organizations who furnished engineering, architectural, and other services. It is not appropriate in a technical paper of this type to endeavor to give individual acknowledgment to the many persons involved. However, omission of such acknowledgments is in no way intended to infer that the author personally initiated or developed the many novel and intricate details developed in the course of the project.

Historical Background

The S.S. *Lurline* was delivered on December 31, 1932, to the Matson Navigation Company by the Fore River Shipyard of the Bethlehem Steel Company. From the time of her delivery until the outbreak of hostilities in the Pacific in 1941, she operated between San Francisco or Los Angeles and Honolulu, having completed some 201 voyages and 1,045,000 miles of steaming before entering war service. Her principal characteristics were as noted in Table 1. After December, 1941, the *Lurline* was operated by her original owners under charter agreement with the War Shipping Administration and carried troops to all parts of the far Pacific as well as to Hawaii. When she was finally laid up for reconversion in June, 1946, she was 13½ years old and had logged a total of 1,490,000 nautical miles, a record which would suggest that, quite apart from the abuse of war service, she was not in the prime of youth. The vessel was of non-fireproof construction of a type which could no longer be built under American law. How long the regulatory bodies, or the traveling public, would support her continuance in service in the face of newer fireproof construction, even if extensive fire control measures were applied, seemed highly problematical.

Before the war, with one smaller and older vessel** supplemented by en route stops of her sister vessels on the Australasian route, the *Lurline* had carried a major portion of all passengers between the Hawaiian Islands and the United States mainland. Air competition had been of minor significance up to the start of the war, but during the war had developed to the point where more persons were being carried by planes yearly than had traveled by ship prewar. Whether this airborne traffic would return in whole or in part to surface travel was something which could only be guessed, since no first rate seaborne accommodations were available to be operated by way of experiment. Experience of the railroads with "streamline" type trains had indicated that the public would support surface travel in addition to air travel provided good, convenient, and economical surface transportation were offered. To a considerable extent air travel patronage had come from increased total travel habits rather than from decrease in surface travel. But if inferior accommodations exclusively were offered, or if no accommodations at all were available for a protracted period, it certainly would encourage a diversion of practically all traffic to the air.

TABLE 1.—Principal Characteristics of S. S. "Lurline" at Time of Original Construction and After Reconversion

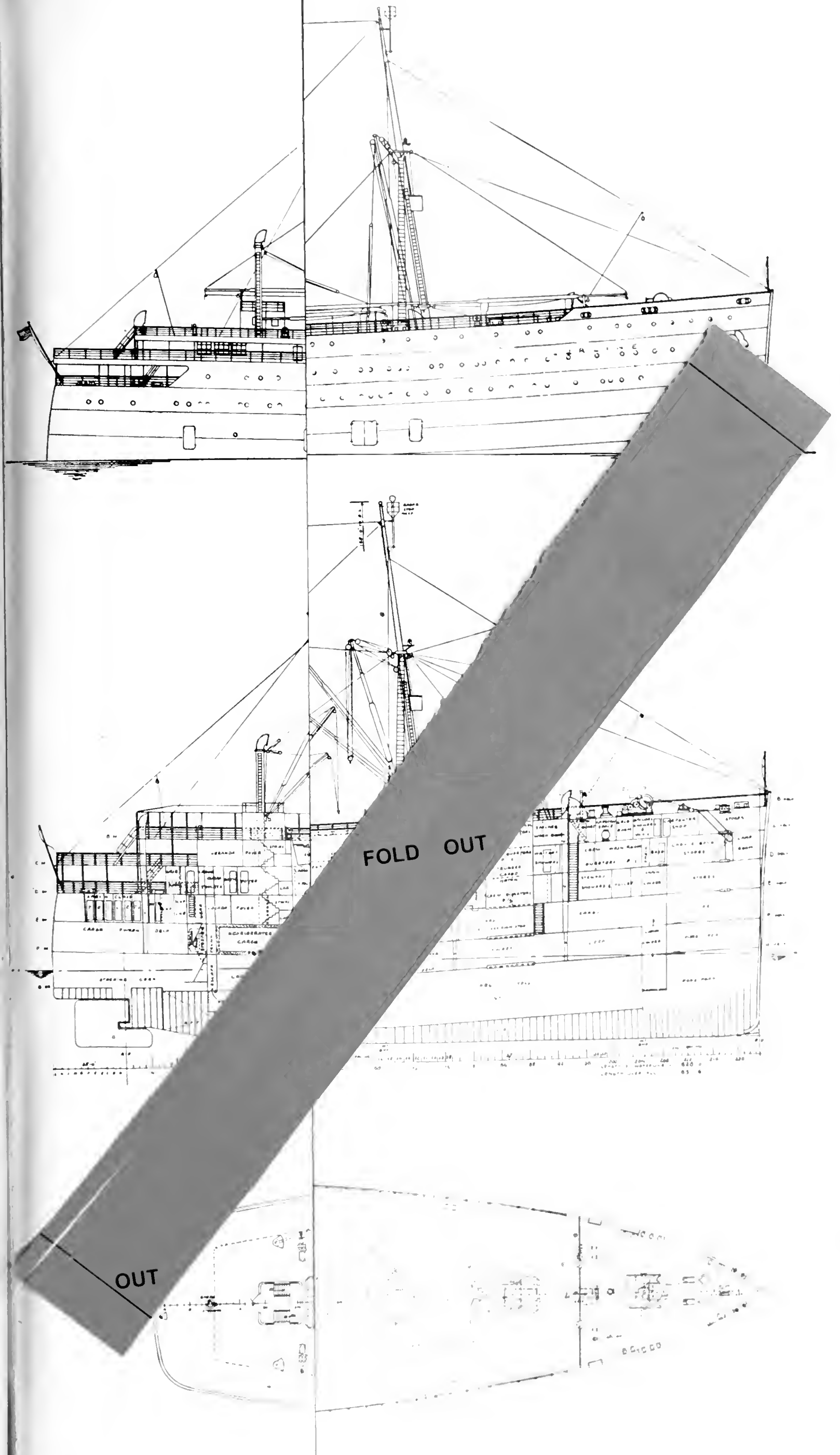
	Original	Post reconversion
Length over-all	631′6-⅝″	Same
L. B. P.	605′	Same
Beam, molded	79′	Same
Breadth, extreme at B deck	82′1½″	Same
Depth, molded to B deck	61′	Same
Depth, molded to D deck	44′6″	Same
Draft, molded	28′	Same
Draft, keel (summer freeboard)	28′3″	Same
Displacement (summer freeboard), tons	26,141	Same
Light ship weight, tons	14,965	15,916
Gross tonnage, U. S.	18,163	18,564.44
Net tonnage, U. S.	10,300	10,075
Cargo capacity, general, mail and baggage, cu ft	274,993	211,083
Cargo capacity, refrigerated (net inside battens) cu ft	30,251	54,101
Ship's stores, dry, cu ft	11,745	11,042
Ship's stores, refrigerated, cu ft	12,241	12,162
Fuel capacity, total tankage, tons	6,611	Same
Free fuel tankage (not subject to ballast compensation — cross connections not fitted in wing tanks), tons	6,611	3,925
Free fuel tankage (not subject to ballast compensation — cross connections fitted in wing tanks, tons	6,611	5,382
Fresh-water capacity, total tankage tons	2,869	2,457
Fresh-water capacity (free tankage not classed as locked ballast)	2,869	652
Passengers, first class (total installed beds)	459*	484
Passengers, cabin class (total installed beds)	234*	238
Passengers, total (total installed beds)	693*	722
Crew, total	358*	433
Shaft horsepower	22,000	Same
Service speed, designed	20½	Same
Speed at rated horsepower, clean	21¼	Same
Keel laid or conversion started	Oct., 1931	June 13, 1946
Shipyard delivery to owner	Dec. 31, 1932	April 1, 1948

* Original passenger and crew complement given is average reached after preliminary operating adjustments.

This, then, was the decision which faced the *Lurline*'s owners at the end of the war: Should this vessel be operated with minor repairs, and refurbishing, and installation of such fire control and other measures as would make her temporarily acceptable to the governing bodies and public, with the prospect of replacement by a new vessel at greater cost at a much later date; or was it possible to modernize her completely in a relatively short period, fireproof her, and place her mechanically in a condition in which the owners could expect her to

* The S.S. *Mariposa* and S.S. *Monterey* owned by the Oceanic Steamship Company were partially reconverted in 1946-1947 for use in the Australasian trade. Reconversions was stopped temporarily due to economic and trade considerations.

** The S.S. *Matsonia*, ex *Malolo*, now sailing under Panamanian regis- at the S.S. *Atlantic*.



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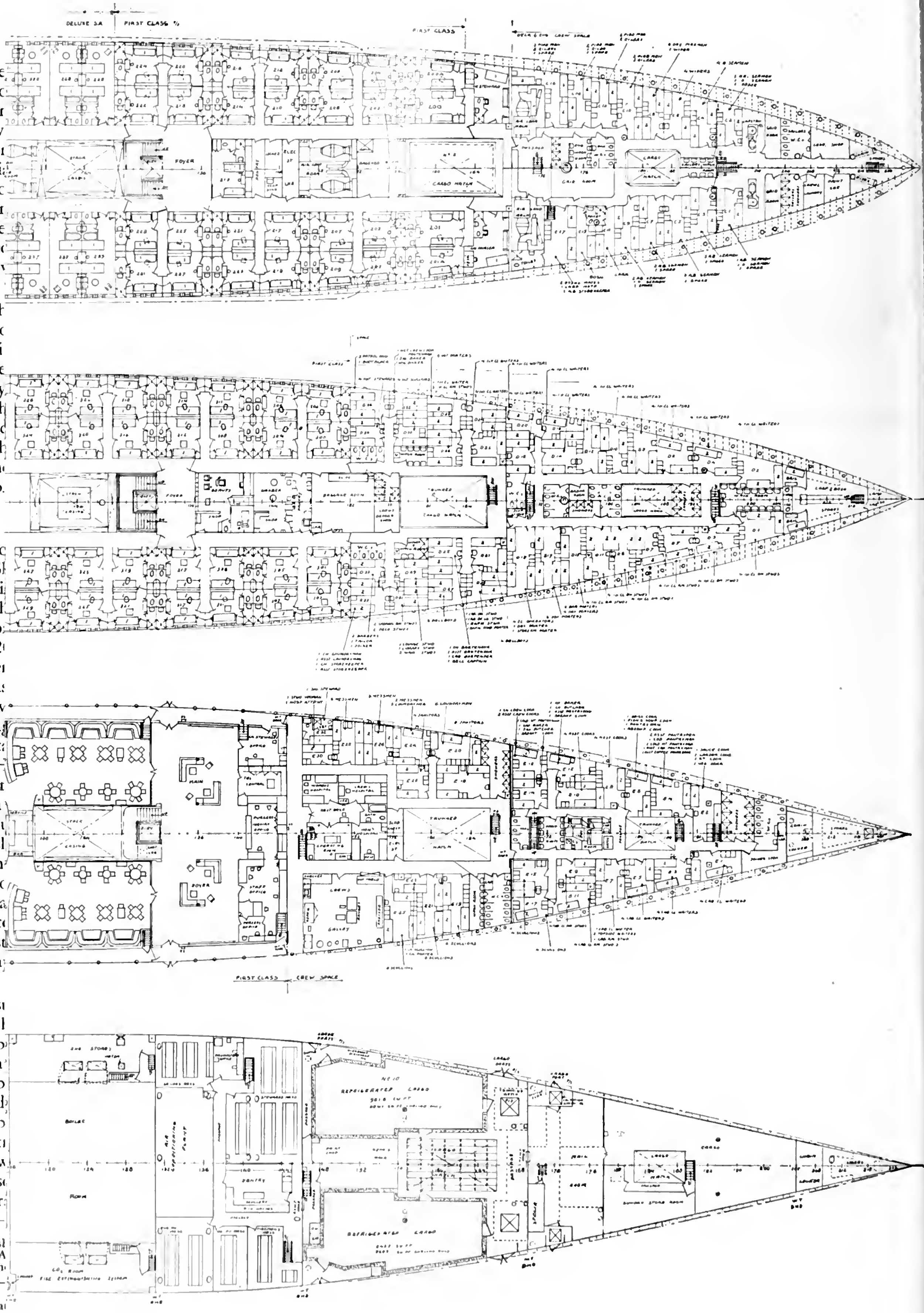

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operate for a period comparable to the length of life of a new vessel. The decision, influenced by the desire to offer the best of modern service to the Hawaiian community and the American traveler in the shortest possible time, was in favor of the latter course. Admittedly the cost, affected partly by a sharply rising trend of prices in industry and partly by engineering and operating difficulties encountered, was in excess of original expectations. Time also was more than expected. However, both cost and time were markedly under those required for construction of a new vessel, and the *Lurline's* first year of operation, now completed, gives every indication that the decision was a sound one and that the results have met with the favor of the traveling public.

After a preliminary planning and design period of approximately seven months, the physical work of reconversion was started in June, 1946, and completed during the 22 months' period ending April 15, 1948. With the exception of final dry-docking, all shipyard work, including plan development, was carried out by the United Engineering Company of Alameda, Cal., a subsidiary of the Matson Navigation Company.

Factors Influencing Design Changes

A description of the work accomplished, both repairs and alterations, will be dealt with in detail in succeeding sections of this paper. Before proceeding to these, however, it is in order to summarize briefly the outside influences (i.e., those not in the nature of wear, corrosion, damage, etc.) which played a major role in determining the new form of the reconverted vessel in contrast to the original design.

First, the Marine Inspection Division of the U. S. Coast Guard had inspected a sister vessel at the owners' request and had rendered the following opinion in December, 1945: "—assuming that surveys of the S.S. *Lurline* and S.S. *Monterey* substantiate the findings for the S.S. *Mariposa,* it will be necessary for these vessels to meet all requirements of Subchapter M relative to fire-retardant construction." This opinion was based on that clause of Subchapter M of the Coast Guard rules which makes this law applicable to all American passenger vessels whose "material alteration" was begun subsequent to May 27, 1936, the Coast Guard's survey having simply determined, in effect, that the scope of work necessary to reconvert the vessel from a trooper to a passenger vessel constituted a "material alteration" in the meaning of the law.

Under this and related regulations it was necessary that the entire interior, including all joiner materials, originally of wood, be replaced with fire-retardant or fireproof material. This obviously meant tearing out the entire outfit of the superstructure to bare steel and replacing with acceptable substitutes of metal or composition.

Although the original Coast Guard opinion included the limiting words "relative to fireproof construction," Subchapter M also contains the following sentences: (1) "All such vessels shall have sufficient strength, subdivision, and stability for the intended service" and (2) "For all such vessels provision shall be made with respect to the arrangement of machinery, boilers, mechanical, electrical, and other equipment, appliances, and systems required by inspection laws and regulations." In view of the sweeping nature of the two latter clauses it is obvious that there was a great deal of room for interpretation as to how far certain rules, intended primarily to cover new construction, might be applied to this reconversion.

In general, the policy and attitude of the Coast Guard indicated a tendency to apply Subchapter M in its entirety rather than just in those aspects dealing with fireproofing. Relaxations were obtained in numerous instances where strict enforcement of all new regulations would have been impossible or extremely disconcerting; but, as will be seen in later sections of this paper, there were few aspects of the ship's design and construction which were not affected to some extent by application of new rules brought to bear under these two broad clauses of Subchapter M.

In November, 1945, the Federal Security Agency, U. S. Public Health Service, notified the owners through the Surgeon General that all vessels being reconverted from wartime service must be ratproofed and must have potable or drinking-culinary water systems brought into conformity with regulations if they were to expect prompt clearance through quarantine without frequent fumigation requirements, a more or less mandatory condition for a large passenger liner. This communication later was implemented by a series of personal inspections and letters of instruction from Public Health Service field inspectors and by plan approvals from the sanitary engineer director of the Vessel Engineering Section of the U. S. Public Health Service in Washington. In the ultimate, this agency, its rules and inspection, also reached into nearly every phase of the vessel's construction. Ratproofing and fresh water sanitation rules affected the entire joiner installation, insulation of structural bulkheads and decks, the refrigerated compartments, the ceiling of cargo holds, the ventilation and air conditioning systems, the furniture, every part of the fresh-water storage and distribution systems, the plumbing and drainage systems, the galleys, the pantries, and the messrooms. Although as a general statement of policy the Public Health Service official in charge of Vessel Engineering stated to the owners that detail compliance with new regulations would be required only insofar as material was replaced during the reconversion (i.e., materials on systems not extensively repaired or altered would be acceptable on the basis that they were previously existing and had been approved when originally constructed), it was found that the work of reconversion necessitated some sort of disturbance, preservation, or treatment of practically all portions of the vessel and that field inspectors were inclined toward an ultimate policy in which the mere disturbance of an article rendered it subject to strictest enforcement of the regulations.

Big Crew Increase

The desires of and agreements with the seafaring personnel and their unions also influenced the final form of the reconversion. As may be seen from Table 1, the total crew required at the time of original construction was 358 as compared with 433 after reconversion, an increase of 21 per cent as compared with an increase of only 4 per cent in the number of passengers served. This

increase had been arrived at over a period of years through the process of collective bargaining, the effect of overtime agreements, and by the influence of wartime operation with its inherent tendency to increase personnel requirements. In addition to increasing numbers of crew, there had been an increase in space required per individual, more subdividing of berthing spaces, more sanitary, entertainment and comfort facilities; and finally there had emerged a group of specialized unlicensed personnel, who, because of particular skills or responsibilities approaching those in the officer classification, must be assigned comparable quarters and facilities. The owners freely consulted with representatives of the unions regarding proposed plans for construction and assignment of quarters, and after numerous changes and alterations received the endorsement of the duly authorized union officials. From the designer's standpoint the most difficult problem posed by all this was the necessity to obtain additional space suitable for crew use without serious encroachment on or reduction of passenger-carrying capacity. The numerous means taken will be treated in detail in succeeding sections of this paper.

Finally, the habits and customs of the traveling public had changed radically since the original construction of the *Lurline* in 1932, and this change also greatly affected the course of the reconversion. In the face of air competition, surface transportation can no longer cater to the individual to whom speed is paramount. Ease, comfort, safety, the opportunity to relax in pleasant and congenial surroundings with good company, good food, and refreshment, games, and entertainment are all factors which the ship must be in a position to offer because competing forms of transportation cannot. The passenger who travels first class will not tolerate inadequately ventilated cabins in which beds and sanitary facilities consume the greater portion of available space. Public rooms and promenades cannot be turned over to the passenger simply for "rest and relaxation." Means must be provided for more active entertainment of varied types.

Since no satisfactory prototype ship was in operation to give experience in just what the public's desires and preferences would be in regard to all these factors, the owners engaged the services of a firm of industrial designers to assist in working out these problems. The firm selected, Raymond Loewy Associates (Los Angeles Office) was one of the foremost in the field with wide experience in the design and styling of numerous types of transportation facilities as well as equipment and products with wide public appeal. It was felt that the usual architectural approach from the standpoint of a "period" design would not produce results to please the modern traveler nor would it be practical of attainment in working with the construction materials permissible or within space limitations available. Instead, the designer was given a relatively free hand to develop a type of functional styling suited to this particular application. The proposals advanced were novel in many respects, but the results and the acceptance of those results by the public have been most gratifying.

In the detailed description of the work undertaken in the various important components of the *Lurline* reconversion, it is suggested that the reader consider the broad influencing factors enumerated in the foregoing. For simplicity and ease of demonstration, a number of minor changes from the original design which had been undertaken prior to the war, or experimented with on a temporary basis, are treated as being incorporated in the reconversion so that in any comparisons made with the reconverted vessel the reader may assume that the "prewar" condition and "original design" are identical unless otherwise specifically stated.

Hull Structure

The original construction of the *Lurline* was, generally speaking, to minimum American Bureau scantlings. Although not so heavily proportioned as certain other vessels of the period, her strength had been demonstrated in service as adequate and, except for a few minor instances of local stiffening, no changes had been necessary in the hull for strength purposes. That the vessel had been to minimum scantling proved most fortunate, since the extensive changes and additions accomplished during reconversion added substantially to the vessel's light weight (see Table 1) and would have reduced available deadweight lift below economical limits had any unnecessary weight been tied up in steel structure.

No significant structural changes were made in the hull below the bulkhead deck except that the wing freshwater deep tanks frames 45 to 55, F to G decks, just aft of the main engine room were eliminated to form, together with the old refrigeration machinery space, a new machinery flat of sufficient size to house the air conditioning plant, the cargo and domestic refrigeration plant, and the evaporator plant. Repair of the main hull, other than renewal of scattered rivets and minor local wasted areas, consisted principally of complete scaling of the exterior from keel to topmast in addition to extensive interior scaling, including a major portion of all coated structural tanks, bilges, tank tops, and voids. All outside keel butt straps and approximately one-half the flat keel were renewed; but, although extensive inspection and drill testing were carried out, no other shell plating was found sufficiently wasted to indicate any likelihood of renewal in the foreseeable future. The rudder plating was built up to compensate for extensive local scouring, and new pintle pin and bushing fitted. Local erosion of the interior of both sterntubes in the area where steel was unprotected by bronze bushings was compensated by welding. The entire hull was recoated using conventional preservative coatings in accordance with the owners' prewar practices, it being felt that there was insufficient evidence that commercially available substitutes for war-developed plastic coatings would assure positive and uninterrupted service through the life of the vessel.

Above the bulkhead deck extensive structural changes were made throughout the vessel to receive the new crew and passenger accommodations. The forward well deck opening from frame 168 to frame 194, extending from B to C decks, was plated over; and the ship's side plating was extended up to enclose the entire area and faired into the hull lines. This new plating, although welded in

subassembly, was riveted to existing structure. The original semi-enclosed promenade on B deck was eliminated from frame 40 to frame 132 and the ship's side plated in from the B deck overhang up to the open promenade on A deck. Although welding was used extensively in this new plating, care was taken to insure that attachments were made to existing structure by riveting. A complete new "sun" deck house was erected atop the boat deck house; because of its high location, this was constructed of aluminum plate riveted to a light steel frame made from "junior" beams. The existing after boat deck house, which originally had been of steel and had terminated just aft of the after stack, was enlarged by the erection of an aluminum and steel structure on either side of the after stack casing forward to frame 94. An open verandah aft of the cabin class area on C deck was totally enclosed to enlarge the cabin class smoking room. Several smaller sections of promenade and open deck area were enclosed with steel or aluminum houses to provide fan rooms, locker, or service spaces.

In all, the following total usable enclosed areas were added through the medium of structural changes (not including areas reassigned from one category to another which in some instances tend to offset or augment these gains):

	Square feet
Machinery spaces and fan rooms	2,376
Passenger stateroom and public space	8,536
Crew quarters	6,414
Total	17,326

Generally speaking, the work on the main hull structure, the erection of the new deck houses and enclosure of promenade and well deck areas presented no problems uncommon to any ship repair project. It might be mentioned in passing, however, that the erection of the aluminum sun deck house, 96 feet long and 43 feet wide, in the most exposed possible location subject to extreme thermal changes and rigidity attached to an existing steel structure presented some cause for concern. The aluminum plating was riveted to a steel bar which in turn was welded to the existing steel structure below. All joints between aluminum and steel were packed with an insulating mastic to prevent action between the dissimilar metals. Taking into account the difference in coefficient of expansion between aluminum and steel and assuming that under tropical sunlight the metal surface would reach a temperature of 140 degrees as against the 70-degree temperature averaged in the shipyard, the aluminum plating would expand, if free, 0.475 inch more in the length of the house than would the steel. Service experience has proved so far, however, that, although there is some visible distortion with changes in temperature, there have been no leaks or cracks developed and it must be assumed that the plating is absorbing the stress due to thermal change satisfactorily.

The most serious structural problem involved in the reconversion was in the internal pillaring and girdering of the superstructure and houses. As previously stated, no extensive change was made below the bulkhead deck. Therefore, from and including E deck and below, the original bulkheads, stanchions, and girders remained intact although the load upon them increased to a minor extent. However, from D deck up to the sun deck an extensive rearrangement of structural supports was necessary to accommodate the new layout of interiors effectively. Although several girders were relocated and many were pierced extensively for ductwork, both with and without compensation, the most substantial changes were made in the type and location of vertical support members. In some instances, stanchions, heavy partial bulkheads, etc., classed as support structure in the original design, were eliminated entirely. Generally, throughout the quarters, wet spaces were located athwartships in double banks in the new arrangements. These wet space bulkheads were of 5-pound steel plate, corrugated by cold pressing to eliminate the need for stiffening angles and to present maximum cleanliness of appearance and upkeep. In way of girders, the thickness of these plates and depth of corrugations were increased locally to afford further support. The arrangement of these bathroom groups was calculated to present a cellular effect, which, although the individual components were of light dimensions, would present rigid columnar support when assembled.

Due to the complexity of this design and the indeterminate nature of some of the loads involved, uncertainty as to effectiveness of attachments in transferring loads, etc., it obviously was impossible to make an accurate analysis of stress to be encountered in the final structure. In the face of some concern expressed that local failures might result in some areas, a recheck was made by the owners and shipyard as well as by the American Bureau of Shipping, and it was concluded that the supports as planned would be satisfactory. However, for a final check it was decided to attempt actual stress measurements in the most critical locations. These observations were made by the use of Baldwin Southwark SR-4 bonded resistance strain gages or rosettes.* Stress readings were taken during the vessel's trial trip (on which heavy seas were encountered) and also during the process of dry-docking. Results of these observations indicated very moderate stresses in all locations tested under static conditions and almost negligible changes in stress due to dynamic conditions. Subsequent observation of the vessel in service bears out the conclusion that structural supports throughout were adequate and that local deformations, where noted, were due to welding distortions rather than to load stresses.

Propulsion Machinery and Propulsion Auxiliaries

The *Lurline*'s main propulsion plant consists of two triple-expansion Bethlehem turbines of 11,000 shaft horsepower each, driving shafts through single reduction Falk gears and receiving steam from 12 Babcock and Wilcox watertube boilers designed for 400 pounds per square inch gage and 675 degrees F total temperature. The boilers are fitted with interdeck superheaters and with air heaters but without economizers. A closed stokehold system of firing is employed. In 1933, these operating pressures and temperatures were considered high, although developments since that date tend to

* For a detailed description of this device see "Static and Dynamic Testing of Structures" by F. G. Tarnall and C. H. Gibbons, *Transactions* of The Society of Naval Architects and Marine Engineers, Volume 52 (1944).

make them appear low in comparison with present installations. The outstanding performance record and reliability of this installation during its operating life* had been such as to convince the owners that no attempt to modernize the plant further simply in the interest of fuel efficiency would be economically desirable. It was decided therefore to limit reconversion work on the main unit to that required to restore the machinery to its original strength, cleanliness, and integrity of performance, and to compensate for additional auxiliary loads.

The main turbines exhibited notable erosion of the casing material alongside the roots of the blading; i.e., in the way of the blade tips of the rotating member. On the *Lurline* this erosion was not as severe as on the two sister vessels, on which it was decided later to renew the intermediate-pressure casings entirely. This erosion became pronounced at about mid-length of the intermediate-pressure turbine and increased in severity through the last stages of the intermediate-pressures and into the first few stages of the low-pressures where it then dropped off in relative intensity. On the *Mariposa* and *Monterey* this erosion reached a maximum of as much as ¼ inch in localized areas. As the depth of the blade roots was ⅜ inch and as the serrations of the roots were exposed in some areas, the resultant reduction in blade support strength on these turbines can be appreciated. It is emphasized again that this maximum condition was not found on the *Lurline.* Since the other two vessels had operated throughout a long period of the war in convoys at reduced speed, a practice to which the *Lurline* was not subjected, and since the greater degree of erosion was considerably more than could be attributed to the slightly greater age of the vessels, it must be concluded that a principal contributing factor in this condition was the greater condensation experienced in the latter stages of expansion while operating for protracted periods at reduced power. Since both intermediate-pressure and low-pressure casings were of cast iron, no possibility existed for building up eroded areas through welding; however, sufficient thickness of material was available in the low-pressures to permit reboring to new dimensions and then reblading with slightly longer blades to compensate.

Since pronounced erosion started directly after the bleeder belt in the intermediate-pressure turbines, it was thought possible that some condensate might be accumulating, particularly at lower speeds, at this point. Also, except in the rare instances when the engines were operating at full power or very close to it, the pressure at this bleeder belt was insufficient to permit fully effective use of bleeder steam for feed heating or for evaporators. In view of these factors, the bleeder point was moved three stages forward to the intermediate-pressure receiver, thereby assuring adequate pressure for steady steam supply to the new evaporator plant plus adequate feed heating, but accepting a slight loss in main plant efficiency. In the case of the sister vessels for which new intermediate-pressure casings were to be constructed, the old bleeder belt was eliminated in its entirety, while on the *Lurline,* where it was decided to reuse the old casings, it was necessary to leave the bleeder belt intact, simply blanking off the outlet flange.

* For full data on original performance see "Performance of the *Mariposa* and *Monterey*" by John E. Burkhardt, *Transactions* of The Society of Naval Architects and Marine Engineers, Volume 40 (1932).

The net result of the repairs and changes (moving bleeder point, increased bleeder consumption, increase in low-pressure blade size) to the main turbines has been a marked decrease in proportionate load carried in the intermediate-pressure and low-pressure turbines as follows:

	Original	After reconversion*
High-pressure turbines	33⅓ per cent	48 per cent
Intermediate-pressure turbines	33⅓ per cent	28 per cent
Low-pressure turbines	33⅓ per cent	24 per cent

* Maximum condition: 2 evaporators on overload orifices.

Results during trials and in service indicate that this redistribution of load has produced no unsatisfactory results or unforseen complications.

The main boilers were stripped completely for cleaning and repairs. An inherent feature of this type of boiler has been the difficulty of maintaining the interdeck superheaters in good condition due to inaccessibility for repairs or for cleaning. Over the period of years since original building, aggravated as a result of wartime operations, a considerable number of plugged superheat tubes had accumulated and scale formations had built up to the point that superheat could not always be maintained at full design value. As it seemed impossible to clean these tubes even with the boilers completely opened up and with ample time for careful work, all superheater tubes were removed and renewed. In addition, all brickwork was renewed and all other parts of the boilers cleaned practically to bare metal, all mounting and internal parts repaired, and insulation and casings extensively refitted. The multiplicity of boilers and difficulty of access as well as the extent of work performed made the over-all cost of this work so high as to approximate the cost of replacement with newer boilers of equal capacity. In addition, reboilering with more modern boilers would have offered the following probable advantages: (1) Fewer units (four as opposed to twelve); (2) reduction in space occupied by boilers, with much space left for other machinery or for payload; (3) some improvement in efficiency; (4) sharp reduction in maintenance costs, particularly on brickwork; (5) possible reduction in operating personnel, particularly if all new boilers were consolidated in one fireroom. In retrospect, it is perhaps regrettable that an extremely short completion schedule at a time when such machinery was in very short supply precluded full consideration to the possibility of reboilering.

The only extensive changes in the propulsion auxiliaries, other than the routine but very thorough overhaul of all units, was in connection with the forced-draft fans and feed pumps. A study of the over-all steam requirements of the plant with its new service auxiliaries indicated an increased water rate of about 10 per cent over the original performance. Study of previous operating and maintenance history and log books indicated that forced-draft fans and feed pumps had operated on a marginal basis in the past, depending somewhat on meticulous internal maintenance of the plant for their ability

to operate without supplemental use of standby units. With the increased steam requirements, they would definitely fall short of capacity. The forced-draft fans were therefore renewed, although their original motors were of sufficient capacity to be retained. The original main feed pumps were retained; but an improved arrangement of steam supply and exhaust and governor piping, and a modification of driving turbine nozzle dimensions satisfactorily increased the pumping capacity of these units.

Both of the main propeller tailshafts were condemned during the reconversion dry-docking due to the presence of small hairline cracks at the forward end of the keyways. A similar condition was found also on the one sister vessel so far dry-docked. These shafts are of hollow-bored construction, fitted with sled-type keys; and the rate of loss in recent years has been high, due to this same condition of small cracks developing at the forward end of the keyways. It is realized that generally greater awareness on the part of all marine inspectors has developed as a result of previous propeller shaft failures, and it is suggested that some shafts may be condemned today which previously would have been left in service because flaws went undetected; nevertheless, the constant loss of such a large item increases notably the maintenance expenses in operating a ship of this type. It is hoped that present study and research in this field, which is understood to be extensive, will result soon in modifications to design or material specification which will eradicate this problem effectively.

Fireproof Construction of Interiors

In accordance with customary practice in construction of passenger vessels up to the late 1930s, the original interiors of the *Lurline* were built entirely of combustible materials, steel being used only to the extent required for structural strength. All interior bulkheads were of veneered lumber; ceiling and linings, where used, were of plywood; both built-in furniture and portable furniture were of wood. It is surprising to note, in retrospect, that even main staircases and stair towers were of wood, although this was entirely customary. Decks were covered with rubber tile on steel, and no insulation was provided on either bulkheads or decks except where needed for comfort insulating. Other than the installation of a few "firescreen doors" in the major fore and aft passageway and roller doors at stair landings which would at best only retard a conflagration, there was no attempt to control the fire menace save through fire detection and extinguishing facilities.

Wood, of course, has three notable advantages for use in interior construction: (1) It is light; (2) it is easy to fabricate into fairly complex architectural effects; (3) relatively, at least, it is cheap. Reconversion of the wood interiors therefore involved three important basic problems: (1) Keeping the installation light enough not to reduce excessively the available payload deadweight or to impair stability. This was particularly important, since the area of structure devoted to quarters was being increased. (2) Producing an architectural effect which would be commensurate with that obtainable with wood. (3) Keeping the cost within reason, while at the same time not impairing the other features. In accomplishing these aims, the owners were fortunate in being able to retain the services of the original joiner contractor, Hopeman Brothers, Inc., of New York and therewith many of the same individual design personnel who had made the original wood joiner installation when the vessel was first constructed.

The basic material settled on for bulkheads, sheathings, and linings was Johns Manville standard marinite. It was determined that, although slightly lighter density material could be obtained, practical considerations dictated use of a material weighing about 36 pounds per cubic foot which would give rise to no strength problems and which would be assured of full Coast Guard approval in all applications. As a sheathing material in all locations exposed to damage in passengers' quarters, sheet aluminum ranging in thickness from 0.020 inch to 0.025 inch was veneered onto either one or both sides of the marinite depending on the location. In crew quarters sheet steel was used as a basic protective veneer instead of aluminum. Wherever marinite was used on ceilings, these were unprotected by metal sheathing, while in ceilings where the insulating effect of the thicker marinite was not required for fire-retardant qualities the harder ⅜-inch marine veneer was used. In general, in crew quarters, cabin class quarters, and the minimum fare areas of first class quarters, the bulkheads were of ¾-inch marinite, sheathed both sides, and supported with metal pilasters of more or less standard construction. In passenger quarters where such bulkheads were used, this necessitated keeping wiring appliances and wire-ways off of divisional bulkheads, or, where individual circumstances prevented such a course, running wiring inside pilasters, and, in a very negligible number of instances, using short lengths of exposed wiring.

For the more expensive first class areas, it was decided to attempt an improvement over this conventional arrangement which would eliminate the unsightly pilaster system of support, would conceal completely all wiring and piping, and, most important, would transmit an absolute minimum of noise between rooms. This latter feature becomes more important in the better first class rooms not only because of the more particular habits of passengers traveling in these accommodations, but also by reason of the fact that such quarters are usually located more remote from the "ship's noises" which tend to blanket room noises. The result of this was the development of the "2-inch" double bulkhead consisting of two pieces of ½-inch marinite separated by a 1-inch air gap and each piece veneered on the outside with sheet aluminum. In addition to solving the problems stated above successfully, it might be mentioned that this bulkhead, since it contains no through metal fastenings, presents a resistance to passage of fire in excess of the requirements of the Coast Guard and also in excess of the conventional marinite bulkhead.

Throughout the interiors every possible advantage was taken of the marinite in ceilings and linings where applied over steel structure to produce the degree of fire-retardant integrity required for the particular location and application. In some cases the thickness of marinite was increased slightly from the minimum required for strength considerations in order to raise the fire-retardant

rating of the resultant composite steel and marinite assembly to the required degree. This avoided the necessity of applying insulation direct to bulkheads or decks except in the case of a few A-60 zone bulkheads. For the aluminum plating in the new sun and boat deck houses the Coast Guard required 4 inches of insulating blanket to protect the aluminum which will not maintain its structural integrity under prolonged exposure to fire. Other deck houses and the ship's sides exposed to sunlight were insulated only the minimum amount for comfort and to decrease load on air conditioning. This avoidance of direct-applied insulation wherever possible also decreased the necessity of ratproofing large areas of insulating blanket, a precaution which the Public Health Service requires to be taken for all insulation over 1 inch thick. Needless to say, the working out of composite combinations of structural metal, marinite linings or ceilings of varying thickness, and insulation blanket to give the exact degree of fire retardance and structural integrity required by the Coast Guard without at the same time involving any unnecessary increase in weight becomes an important and complex phase of the entire operation requiring close coordination between the joiner contractor, the yard, and the Coast Guard. It is noted that the *Lurline* contains 28 "typical" combinations of these several factors, each entirely different from each other, but each being used extensively over large areas of the vessel.

An interesting variation on the requirements for main zone bulkheads was developed by taking advantage of the provision in the rules which states that a Class A bulkhead may be substituted for a Class A-60 bulkhead where a distance not less than one frame space in width and normally containing no combustible material intervenes between such bulkhead and any parallel Class A or B bulkhead. Throughout all first class passenger spaces, use was made of the bathroom and toilet spaces, which were arranged athwartships. Since these spaces complied with the requirements of the foregoing provision, no insulated or lined A-60 zone bulkheads were necessary through much of this area.

The fire door system throughout the accommodations was of the conventional type employing magnet-held, self-closing doors capable of release from the pilot house or from local switch stations, there being a total of 108 magnet-held and 32 free swinging insulated fire doors throughout the vessel. In the way of main stair towers, in lieu of closing off the deck landings in the usual manner, a system was devised in which passageways fore and aft and athwartships from the landing were fitted with magnet-held concealed doors and surrounding bulkheads insulated or lined to A-60 requirements. Although this substantially increased the number of fire doors required, the results very notably improved the appearance and ease of access. This is particularly helpful in handling sailing-day crowds, in which the customary system of door-isolated fire towers would impede seriously the usual last minute effort to clear the ship.

As previously indicated, insulation of decks for horizontal fire zoning in passenger quarters to the required degree of fire-retardant integrity was accomplished by use of marinite ceilings of proper thickness beneath the deck, and only in crew quarters, where no ceilings were used, was insulating effect obtained through use of conventional magnesite deck-covering overlays.

Furniture used prewar, both fixed and portable, had been of wood with the exception of passenger beds, crew berths and lockers, and dining saloon chairs. After reconversion these same items, of course, remained of metal, and most other furniture also was converted to metal with the exception of miscellaneous stateroom chairs and a few public space chairs, cabin class stateroom drawer chests, stateroom coffee tables, bars, pianos, banquettes, officers' berths, and a few similar items. There are certain types of furniture which it is practically impossible to build of metal at any economical cost, and which, even if cost is disregarded, cannot be built to have satisfactory appearance in metal. The Coast Guard rules, appeared to take some recognition of this fact, and although the degree of fire-retardant insulation required was slightly increased by reason of using some wood furniture, it appeared that such increase is still preferable to an all-out adoption of metal furniture.

In general, the ventilation systems were vertically zoned to adhere to all Coast Guard requirements with respect to fire control with the following two minor exceptions which could not be avoided due to the extent of re-use of existing equipment or arrangements: (1) No central cut-off switch for blower systems, except at the main switchboard, was provided, and (2) a few air ducts passed through main zone bulkheads or through stair tower enclosures. In the latter case, all instances were compensated for by the installation of fusible-link fire dampers so that adequate protection was provided.

It is notable that the fireproofing of interiors, which in itself constituted the largest single item of the reconversion, did not result in compensatory reduction in fire extinction or detection facilities. As regards detection, there were considerably fewer automatic alarm relays after reconversion; but the essentials of the alarm system were still retained in order to cover numerous areas in public rooms and service spaces throughout all parts of the vessel. The fire patrol was reduced from a 20-minute to 1-hour basis, which, in combination with the increase in number of key punch stations, reduced the required number of patrolmen from 3 to 2. These, however, are the only reductions in requirements resulting from fireproofing. Smoke detecting and CO_2 flooding systems remain substantially in accordance with prewar installations. A comparison of the Coast Guard Inspection certificates before and after reconversion reveals that, although the vessel was completely fireproofed in the interim, the number of feet of fire hose required was increased from 5,000 feet to 10,900 feet, the number of portable fire extinguishers increased from 82 to 104, and the number of fire axes increased from 8 to 14!

Passenger Accommodations

As shown in Tables 1 and 2, although the total passenger capacity of the *Lurline* after reconversion was somewhat increased from the original design, the total area assigned to staterooms, public rooms, and promenades was actually decreased; and the unit area per passenger in each category was also decreased. In spite of this the maximum occupancy in first class rooms re-

TABLE 2.—Gross Deck Areas Assigned to Passenger and Crew Use, S.S. "Lurline"

	Total sq ft		Increase or decrease		Sq ft per passenger or per crew member		Increase or decrease of sq ft per person
	Original design	After reconversion	sq ft	per cent	Original design	After reconversion	per cent
Passenger staterooms*	75,122	79,850	+4,728	+6	108 sq ft per passenger	105 sq ft per passenger	—3
Passenger public spaces, including large foyers, shopping centers, and offices	35,504	35,571	+67	0	51 sq ft per passenger	49 sq ft per passenger	—4
Promenade, play areas and pools accessible to passengers	49,331	34,639	—14,692	—30	71 sq ft per passenger	48 sq ft per passenger	—32
Crew quarters**	20,167	27,985	+7,818	+39	56 sq ft per crew member	65 sq ft per crew member	+16
Galleys, laundries, shops, large pantries, medical spaces, major baggage rooms and similar service spaces	13,281	13,543	+262	+2	19 sq ft per passenger	19 sq ft per passenger	0

* Passenger stateroom areas include staterooms and sanitary spaces, adjacent passageways, small foyers, deck pantries, small trunk rooms, and minor service spaces.

** Crew quarter areas include crew and officer rooms, sanitary spaces, adjacent passageways, messrooms, etc. etc., but not deck lounging areas assigned to crew use.

mained at two per room, and the cabin class maximum occupancy was reduced from four to three. All first class staterooms were fitted with private bath facilities as opposed to the prewar basis of some private and some community baths. Finally, the effective usable area of the average room was substantially increased. This was accomplished solely through the medium of more effective and efficient utilization of space, by designing every square inch of area to some useful function, and in some cases using certain areas for more than one function. The amount of apparent usable stateroom space per occupant in many instances was increased with an actual decrease in measured deck area.

TABLE 3.—Comparison Between Passenger Stateroom Characteristics Before and After Reconversion of S.S. "Lurline".

	Original design	Post reconversion
Number first class beds	459*	484
Number first class staterooms	250	255
Number first class single staterooms	41	26
Number first class double staterooms	209	229
Number first class staterooms with private bath or shower	153	255
Number first class staterooms using community baths	97	0
Number first class outside staterooms	177	148
Number first class inside staterooms	73	107
Number first class lanai suites (bedroom, verandah, dressing room, bath)	8	6
Number first class deluxe suites (bedroom, sitting room, bath)	2	0
Number cabin class beds	234*	238
Number cabin class staterooms	70	98
Number cabin class double staterooms	5	56
Number cabin class 3-person staterooms	36	42
Number cabin class 4-person staterooms	29	0
Number cabin class rooms with private bath	0	0
Number cabin class Bibby rooms	15	0
Number cabin class outside rooms (except Bibbys)	35	39
Number cabin class inside rooms	20	59
Number upper berths in cabin class	98	98

* Original passenger complement given is average reached after preliminary operating adjustments.

The two major developments chiefly responsible for this improvement in passenger staterooms were, first, air conditioning of all quarters and, second, the extensive use of convertible furniture. Through air conditioning, a considerable increase in proportion of inside rooms without comparable reduction in relative revenue was made possible, and the undesirable and inefficient Bibby rooms were eliminated entirely. Through the use of convertible beds in all but the larger and more expensive suites and by designing rooms in a rectangular or nearly square shape, passengers had full advantage of the entire stateroom area for daytime use. Among other devices was the careful location of wardrobes and drawer chests, either recessed completely or so located as not to cut into the useful living space of the room. Throughout first class, provision of 100 per cent private bath space eliminated the exposed stateroom washbasin common to all but the highest priced rooms previously. Finally, much more extensive use of mirrors than ever previously attempted in stateroom design still further increased the apparent size of staterooms. This latter device, which certainly is not new, was adopted in the face of predictions of serious maintenance problems; but the results to date have indicated these fears were unfounded. Table 3 indicates the changes between prewar and post reconversion characteristics of passenger stateroom space.

It was the owners' desire that, in adopting convertible beds, there be no decrease in passenger comfort. For this reason the joiner contractor was asked to develop a new type of wall bed and a new sofa bed in which certain features were to be considered mandatory. They must have a mattress size of 6 feet 4 inches by 32 inches; the daytime sitting surface must not be on the sleeping surface; they must contain an innerspring mattress of regulation thickness plus full floating springs below the mattress; they must have a comfortable daytime seating surface at standard chair height above the deck; it must be possible to make them up during the day for the passenger to open without assistance at night; it must be possible to stow a standard suitcase beneath, both in day

Views of reconversion on "Lurline."

Top to bottom:

Fig. 8—Typical first class two person outside stateroom, B, C, or D decks, on the "Lurline" after reconversion. The room is made up for daytime use, communicating door to inside room open. These rooms are in minimum first class fare range.

Fig. 9—An equivalent minimum first class fare room on D deck prior to reconversion.

Fig. 10—Typical first class de luxe room on C deck after reconversion.

Fig. 11—Equivalent room on C deck before reconversion.

and night position; and they must be absolutely "foolproof" in operation and safety features.

This was admittedly a difficult specification, but the resultant sofa bed and companion wall bed, developed especially for the job, although expensive, have overcome successfully the numerous fears and objections raised against the use of convertible furniture and have been fully acceptable to the traveling public. Because they can be converted to night use by a passenger with no particular mechanical aptitude, they do not involve overtime costs for stewards' department personnel to make up rooms for nighttime occupancy after working hours.

As may be noted from deck plans, the majority of first class staterooms are fitted with bath facilities and toilet facilities in separate compartments. Although this feature was introduced primarily from the standpoint of appeal to the traveling public, it also permits the use of a space no wider than one frame space for this purpose, is highly useful in obtaining a good stateroom arrangement without small undesirable recesses, in some instances it is worked into the fire bulkhead system as explained elsewhere in this paper, and provides an uninterrupted runway for overhead piping and ductwork. It involves, however, a duplicate installation of washbasins, and hence two more water outlets and one more drain connection per room. It is questionable whether, in the final analysis, such an arrangement can be justified on any other basis than its appeal to the deluxe trade.

In the cabin class accommodations, the principle adopted and consistently followed was that cabin staterooms should offer accommodations equivalent to bedroom space on "streamline" trains. However, drainage problems involved on shipboard, particularly on lower decks and over refrigeration spaces, make the fitting of individual toilet facilities, commonly found in train bedrooms, an almost insurmountable problem without extreme expense and interference with other facilities.

Passenger public spaces remained of substantially the same area after reconversion as prewar, with the exception of the cabin class smoking room, which was enlarged and expanded by inclusion of a previously little used open verandah. Public spaces, of course, were completely redecorated in conjunction with fireproofing of paneling. Bar service was increased by the installation of two additional bars and by the enlargement of those previously existing. Game facilities were expanded and improved. Shop, display, and exhibit areas were improved as to utility and location, although not greatly increased in area.

Considerable concern was felt, prior to commencement of operations, over the necessary curtailment in promenade and open deck area. However, subsequent experience in service indicates that remaining deck areas are comfortably adequate, partly due to more efficient use of remaining space such as by the elimination of deck-mounted fans and possibly in part due to the fact that play areas on shipboard are still large in contrast to those

found on other types of transportation which have conditioned the traveler, subconsciously, to an acceptance of congeniality as a substitute for spaciousness. In any case the reconversion did away with practically all promenade areas located directly outside of staterooms. This type of space has proved unsatisfactory in past service due to disturbance of persons occupying the staterooms which border on the promenades. Passengers pay a stiff premium for outside rooms and, if the blind must be raised at all hours to afford privacy, the room occupant feels that he has not received an adequate return for his premium price. Similar difficulties in the past had given rise to the not altogether satisfactory practice of closing off all such promenades in the early evening and reopening them in the mid morning.

Prior to reconversion the *Lurline* had been fitted with two hatch-top type swimming pools, one forward of the bridge front for use by first class passengers and one aft on No. 3 hatch for cabin class. Analysis of previous operations showed that the exposed location of the forward pool prevented it from being placed in use on any but rare occasions. The result had been that, in practice, the after pool was used for both first and cabin class. Since relatively few passengers made use of the forward pool, there seemed to be no valid argument against "making official" a practice which had actually become more or less common; and accordingly the forward pool was eliminated, and the after pool is now used for both classes.

Somewhat similar situations had developed in past years in connection with other public facilities and services, and a careful analysis of each was made in connection with the reconversion with the result that a number of practices were discontinued. In vessels of this type there has been a tendency to provide certain convenience features purely on the basis that they appeal to the eye when displayed in advertising literature. Actually, however, some of these are very little used by the average traveler; they take up room on board, and require personnel which could much better be occupied in providing comforts for larger numbers of people. For these reasons the following were not installed in the reconverted vessel even though they may have been installed at various times in the past, or are fairly common in other vessels of the type: gymnasium, "electric bath" and massage, bank, separate beauty and barber shops in each class, children's playroom, reading and writing rooms as separate spaces, and similar features. From the standpoint of "the greatest good for the greatest number" many such items are unwarranted on shipboard and there is much that can be done to combine less popular facilities and to avoid duplication of facilities where an assignment on part time basis will permit serving more than one class.

In the original design of the *Lurline*, a considerable number of staterooms and public rooms were provided with crank-operated sliding windows. Operating experi-

Views of reconversion on "Lurline."

Top to bottom:

Fig. 12—A lanai suite after reconversion. Dressing room, located inboard, not shown.

Fig. 13—An equivalent lanai suite prior to reconversion.

Fig. 6—Cabin class stairway at D deck after reconversion, built entirely of steel and aluminum. Note absence of any but flush doors so that access is unimpeded for sailing-day crowds.

Fig. 7—The same stairway at time of original construction. All parts are of wood except stair landing.

ence has proved it impossible to keep these windows completed watertight, while most types of windows which could be made fully watertight were beyond the operation of either passengers or room stewards. Over a period of years, damage to passengers' effects and ship structure due to leaks, and loss of crew time endeavoring to tighten windows and clear drain pans had been considerable. A survey of general opinion indicated that the average traveler on shipboard, although he does not object to a window, rather looks on an airport as a preferable feature, a novelty which he cannot enjoy at any other time. With a few exceptions, notably that of the full-length windows in the six lanai suites, all stateroom windows were eliminated during the reconversion and large aluminum frame airports were substituted. In public spaces windows were retained as previously, but, in instances where new arrangements required change in number or size of windows, fixed light type windows were used in lieu of sliding or casement types previously preferred. This substitution likewise was made to reduce leakage and maintenance problems and was made possible by the air conditioning of the quarters.

Views of reconversion of "Lurline."
Top to bottom:
Fig. 20—The first class dance pavillion after reconversion.
Fig. 21—The same area before reconversion.
Fig. 22—The same area during reconversion. Note extent of removals, except for maple dance floor which was retained.

It had been the custom of the *Lurline*'s owners to use rubber tile as a deck covering throughout all passenger staterooms, public spaces, and passageways, supplementing the rubber tile with small throw rugs in staterooms and runners in public spaces. These rugs and runners can be thoroughly cleaned by taking them ashore as often as necessary, and the rubber tile can be washed as frequently as desired without danger of damage. This procedure, as opposed to the common practice of fitting full-size carpets over composition decking, has been notably successful both from the standpoint of general cleanliness and cost of maintenance. In the original construction, $\frac{1}{4}$-inch rubber tile had been used throughout, this being secured by adhesives in some cases directly to the steel decks. So successful had this been, that in the reconversion, it was felt possible to reduce the tile thickness to $\frac{3}{16}$ inch and to lay the tile directly on steel decks in all staterooms except for the leveling of joggles in plate laps and similar surface depressions by the use of a master filler as explained elsewhere in this paper.

Figs. 9, 11, and 13 are reproduced from photographs of a few typical staterooms taken when the original construction was first completed in 1932, while Figs. 8, 10 and 12 are photographs of equivalent staterooms taken after reconversion. Fig. 8 shows both types of convertible bed and is representative of the vast majority of rooms, while Figs. 10 and 12, showing ordinary non-convertible beds, represent the deluxe and lanai type room which are relatively few in number. Figs. 21, 25, 29, and 31 are photographs of typical public rooms when originally completed while Figs. 20, 24, 28, and 30 show the same rooms upon completition of reconversion. In each case the camera position and camera angle is as nearly identical as possible. Figs. 22, 23, 26, and 27 show various areas during the height of reconversion activity and indicate more graphically than words the extent of removals which were necessary to effect a complete fireproofing of the interiors.

Crew Accommodations

As stated previously the crew and officer complement required to operate the *Lurline* had increased from an original 358 to a total of 433 under current agreements. In addition to this increase in numbers there have been increases in requirements for space and equipment per man. Whereas in the original vessel the lower ratings were quartered in large open forecastles numbering up to a maximum of 40 men in a single space, present custom required that in no case should more than six men be quartered in any one room. The number of six-man rooms was limited, and for the majority of cases four men per room was considered standard. The size and quantity of articles of furniture were to certain minimum requirements. Bunks were standardized to a mattress size

of 29 inches by 74 inches and locker sizes were to generous dimensions similar to those adopted by the Maritime Commission, while numerous additional supplementary stowage facilities were provided for each crew member, in sharp contrast to the limited half-height narrow lockers common in the original design. Comfortable folding chairs were provided for a specific proportion of the number of men in a room. A washbasin with hot and cold water was provided in every room; care was taken to furnish adequate berth lights; off-duty entertainment was provided through multi-channel entertainment radio outlets in every room; and last, but not least, every room assigned to crew use was air conditioned.

The type of space assignable for crew berthing space is more limited than heretofore. In the original arrangement, much of the forward portion of F deck was set up for crew berthing. Under present standards no space below E deck was considered acceptable. Likewise, crew rooms were originally located at C deck level in the raised forecastle forward of bulkhead 205. Although this is actually above the top of the collision bulkhead, this space is no longer acceptable for crew quarters on the basis that it is forward of a projected line from the top of the collision bulkhead. Certain classes of personnel have developed a relatively more important status on board ship and have been assigned better types of quarters than was the custom in the past. Although in part a result of bargaining agreements, this is principally the result of a desire on the part of the operator to make more attractive quarters in an attempt to reduce turnover in such key ratings as headwaiters, bartenders, pursers, quartermasters, plumbers, electricians, and similar specialists.

Finally, certain minimum requirements of Coast Guard Regulations considerably supplemented by custom and agreements require that careful lines be drawn to avoid overlapping of quarters and facilities for members of different departmental organizations. Community toilet facilities cannot be in the same compartment as washing facilities. On the other hand, firemen cannot use any of these facilities in conjunction with sailors, nor can either of these overlap with the stewards. Similarly, the radio operators and mates, engineers, and pursers must all have individual facilities. This gives rise to a very complex installation of plumbing equipment and is certainly not conductive to efficient use of space. Of course, a similar segregation must be followed in the assignment of berthing and messing spaces.

To meet the various increased requirements it was necessary to take over a part of the area previously assigned to passengers' staterooms; but the bulk of additional space to meet these requirements came from the installation of new super-structure houses and through the filling in of the forward well deck, thus reducing promenade areas. The well deck previously had provided an outside lounging space for the crew substantially shielded from the vision of passengers and also partly protected from wind and weather. It also had served the purpose in very heavy weather of breaking the front of the main superstructure house. Elimination of the well deck virtually closed off the foredeck to passenger use, a change which necessarily was integrated with the elimination

Views of reconversion of "Lurline."

Top to bottom:

Fig. 24—The first class lounge after reconversion.

Fig. 25—The same area before reconversion.

Fig. 23—The same area during reconversion.

of the forward swimming pool.

Crew messing facilities were revised completely during the reconversion. It had been a common prewar practice for members of the stewards' department to eat in the main galley and adjacent passageways during or after passenger meal hours. This practice has now been discontinued; and sufficient messing space must be provided for members of the stewards' department on an equal basis with other departments. Since this is by far the largest department on a vessel of this type, a complete rearrangement of messroom areas was necessary, a move necessarily accompanied by enlargement of food-handling facilities between the crew galley and crew

pantry and enlargement of the crew pantry itself.

Table 4 presents a statistical analysis of important changes as regards number of crew, space assigned, concentration of individuals per unit of space, number and type of facilities provided, etc.

Air Conditioning

As originally constructed, the *Lurline* was fitted with air conditioning equipment in the main dinning saloon only. All other parts of the passenger and crew spaces, as well as of the engineering and service spaces, were ventilated with conventional mechanical supply and exhaust systems distributing through the usual ductwork, and in the passenger spaces, terminating in the so-called "punkah louvre" type of outlet. Fans were located on open deck spaces and promenades and were of the centrifugal type with waterproof, totally enclosed motors.

Views of reconversion of "Lurline."
Top to bottom:
Fig. 28—Cabin class dining saloon after reconversion. Note use of cove lighting and complete absence of visible air conditioning grillework.
Fig. 29—The same room before reconversion.
Fig. 27—The same room during reconversion. Note complete removal of all interiors.

TABLE 4.—Comparison of Crew Accommodations and Facilities Provided After Reconversion as Opposed to Original Design, S.S. "Lurline"

	Original design	Post reconversion
Total crew complement	358	433
Number berthing spaces possible	392	435
Spare berths	34	2
Number rooms	68	142
Number 1-berth rooms	17	37
Number 2-berth rooms	9	22
Number 3-berth rooms	7	8
Number 4-berth rooms	7	60
Number 6-berth rooms	12	15
Number 8-berth rooms	5	0
Number 10-berth rooms	4	0
Number 18-berth rooms	3	0
Number 20-berth rooms	1	0
Number 22-berth rooms	1	0
Number 40-berth rooms	1	0
Number private bath rooms	7	12
Number communicating bath rooms	1	9
Total crew toilets	48	82
Total crew washbasins	83	214
Total crew showers	43	80

Upon determination that the reconversion should include installation of complete air conditioning in all passenger staterooms, passenger public spaces, and crew and officer quarters and messrooms, a careful study was made of all types of air conditioning equipment available for marine application. It was decided eventually that a medium-pressure type system with induction-type recirculation and individual thermostatic control of temperatures should be used in passenger staterooms while a conventional terminal reheat system would be satisfactory in crew quarters, and that a centrifugal-type Freon 11 central cooling plant would best serve the requirements of a large passenger vessel of this type. Although the basic system selected was not new and had been used extensively in shoreside installations, there were a considerable number of features in connection with a large marine installation of this type which presented novel problems and involved a good deal of experimentation and careful development during the process of installation. A complete description of all features of the installation and of all the problems involved would be a fit subject for a separate paper. The paper, therefore, is limited to a brief description of the more important features and to endeavor to show with a few pertinent illustrations the essential characteristics of the air conditioning plant as installed. (This section is deleted from our reprinting at the suggestion of the author—Editor.)

Stability and Subdivision

As a result of the application of Subchapter M of the Coast Guard rules and regulations, the Coast Guard was empowered to examine the stability and subdivision of the *Lurline* in the light of rules passed after the original construction of the vessel. Originally, no definite and

specific stability or subdivision criteria had been contained in the rules and no particular attention was paid to these features by the Bureau of Marine Inspection and Navigation until 1936 when a general study had been made of all passenger vessels, the *Lurline* among them. At that time the *Lurline* had been accepted without modification.

In so far as longitudinal subdivision and floodable length requirements were concerned, a new study was made and curves of floodable length submitted to the Coast Guard which indicated the vessel to be substantially satisfactory on a two-compartment basis with due regard to the discontinuous marginal line which is stepped down from D to E decks in the midship area between frames 47 and 146. Although the combined length of the compartments between frames 131 and 169 (in way of the forward step of the margin line) was slightly in excess of the floodable length to E deck, this was accepted by the Coast Guard under Section 46.012 of the Load Line Regulations on the basis of an arrangement in existence prior to November 7, 1936.

Stability requirements presented a more difficult problem. It was to be expected that the reconversion would give rise to a considerable increase in light ship weight; and of course, as necessarily always happens on this sort of work, most of the weight increase would be above the center of gravity of the ship with a net result that the light ship *GM* would decrease, this decrease representing a combination of various changes, including fireproofing and other factors required by the various Government rule-making agencies. In effect, the owners were caught between the two fires of decreasing physical *GM* available (partly brought about by rule changes) and increasing required *GM* (also brought about by rule changes). Preliminary estimates reached in a study made by the vessel's original builders indicated a weight increase approaching 800 tons and a *KG* increase of approximataely 0.8 foot. Coupled with a loss of approximately 0.75 foot in *KM* due to the increased displacement, this appeared to indicate that the ship's original *GM* (dry, bare ship) of 1.6 feet would be reduced to zero or possibly to a small negative amount as a result of the reconversion. It was obvious therefore that substantial quantities of ballast would be required to be carried after reconversion. As a first and obvious step in meeting this situation the large evaporator plant described in other sections of this paper was planned in order that most fresh-water requirements could be met without the necessity of using water from double-bottom tanks, and so that some of the fresh-water deep tanks might also be made available for locked ballast if required.

Conferences and correspondence with Coast Guard officials resulted in a recognition that strict adherence to all of the detailed requirements as regards stability for a new vessel would result in prohibitive operating restrictions, and therefore would preclude any possibility of reconverting and continuing the vessel in American service. The requirement limiting heel due to windage therefore was withdrawn, and it was agreed that a thorough analysis would be made to determine, under the rules, the initial *GM* required to resist damage, based on one compartment subdivision as indicated by a calculated factor of subdivision of 0.53. This was in late

Fig. 30—Top: A part of the cabin class smoking room on "Lurline" after reconversion. Note use of mainmast base as center piece for bar.

Fig. 31—Bottom: The same room before reconversion, finished in combustible material throughout.

1945, and the rules then in effect required that, after flooding, heel due to negative residual metacentric height should not exceed 15 degrees or immerse more than one-half the freeboard to the margin line. After proceeding with the development of plans and procurement of material for the reconversion, but before submission of final stability calculations, however, the Coast Guard notified the owners that, due to possible adverse influence of the dynamic effects of negative residual *GM* upon lifeboat launching operations, it would be necessary to disallow any calculations which indicated a negative residual *GM* after damage. Although this tended, in effect, to offset the previous arrangements with regard to wind heel, cauculations were completed and submitted to Coast Guard Headquarters on this basis.

Eventual agreement was reached between the Coast Guard and the owners on a *GM* requirement, as determined for the critical area in the way of wing tanks from frames 92 to 116 under the various possible conditions of loading. This requirement was substantially as represented by the composite shaded curve XX_1 shown in Fig. 46. It was stipulated that this curve would govern only if midship wing deep tanks were ballasted as used or fitted with cross connections, it being left to the discretion of the owner whether he preferred to fit complicated cross-connecting piping and valves or to work ballast in and out of the wing tanks.

Throughout the entire course of the reconversion every effort was made to reduce topside weight increases to an absolute minimum, making full use of such materials as aluminum, corrugated metal bulkheads, junior

beams, and similar newly developed devices. In some instances it was necessary to make strenuous representations to the regulatory agencies in connection with provisions of the rules which, with relatively obscure advantage in over-all safety of the vessel, would have involved prohibitive increases in weight. As an example, the matter of deck overlays in the passenger spaces is illustrative. As previously mentioned, the owners were satisfied to lay rubber tile deck coverings directly on steel decks in staterooms, using a mastic underlayment only where necessary to fill in sharp depressions, plate

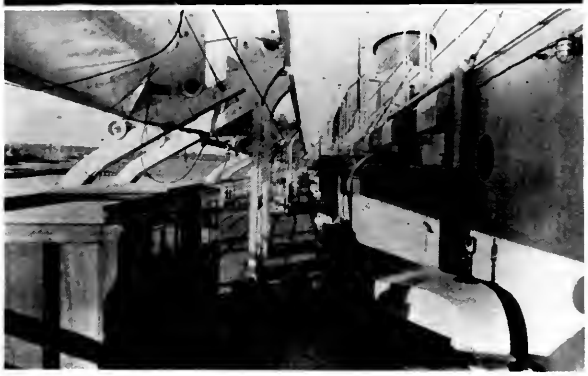

Fig. 44—Top: View of boat deck on "Lurline" after reconversion, showing the exposed (but insulated) distribution ducts for air conditioning leading from Sun Deck fan room to overhead of public spaces on A Deck. Note clean appearance.

Fig. 45—Bottom: The same deck at time of new construction. Note clutter of fans and ductwork on promenade.

laps, etc., and to lay rubber tile similarly in public rooms and passageways on a minimum mastic underlayment of 3/8 inch. Even the thickness of rubber tile was reduced from 1/4 inch to 3/16 inch in the interest of weight saving. Adherence to this procedure in lieu of the more common 5/8 inch or more of magnesite or Magnabond under carpeting or tile resulted in a weight saving of 140 tons on the *Lurline's* 110,000 square feet of interior passenger decks, lowering the center of gravity of the bare hull by 2 inches and increasing its *GM* by 3 1/3 inches. Yet adherence to this scheme was immediately in conflict with the Coast Guard rules regarding acceptable deck coverings. At the time the *Lurline* reconversion was started, magnesite or Magnabond type deck coverings were the only ones fully approved for use on passenger vessels in all thicknesses. Magnesite had the serious drawback that it must be laid to a minimum thickness of 5/8 inch to give satisfactory service without cracking or loosening, and it could not be tapered off to a feather edge. Mastic deck coverings of a type physically suited to application in very thin layers and which could be feathered off to zero thickness failed to pass the rigid Coast Guard test because of smoke emission characteristics. Under strenuous protests by the owners to Coast Guard headquarters a material which closely approached but did not fully meet the required characteristics was finally approved on a single project basis only by exercise of the Commandant's prerogative to relax requirements where full compliance might result in unreasonable hardship!

Final results of the reconversion changes, as proven in the inclining of the vessel just prior to redelivery, resulted in an actual light ship weight of 15,916 tons, a *KG* of 37.73 feet and a resultant *GM* of —2.05 feet, indicating that the preliminary estimate of weight increase had been short by only 150 tons, but that the actual center of gravity of the weight increase had been considerably higher than first estimated. Based on this light ship *GM* and applying an anticipated loading procedure for the Hawaiian service using all double-bottom tanks except No. 9 (engine-room reserve feed tank), peak tanks and six small fresh-water deep tanks for locked ballast, anticipated initial *GM* in any likely condition of operation would lie within the grid (AA_1 BB_1) in Fig. 46. Based on this, a minimum operating draft of 23 feet was assigned to the vessel by the Coast Guard.

The effect of inherent loss of stability in bringing an older passenger vessel up to present standards, combined with increased requirement for stability, is a serious impediment to continuance in service of older American flag vessels through modernization. Because of the small number of such vessels to emerge from the war, it is a problem which has not been faced frequently; but it is probable that not all such vessels would have been as well able as the *Lurline* to meet this situation simply by the acceptance of operating restrictions on the part of the owner, and the waiver of certain requirements by the Coast Guard. It was once an accepted practice in passenger vessel design to endeavor to minimize *GM* in the interest of passenger comfort, but under present safety regulations it is certainly more wise to consider the tendency of such vessels to accumulate changes of a type which result in greater light ship weight and increased *KG*. To meet this; an ample reserve of *KM* can best be provided by designing with ample beam, it being more economical, through reasonable operating procedures, to reduce a slightly excessive *GM* than it is to build up a deficient *GM* by the addition of ballast or by operating restrictions on the use of liquid tanks. Although this thought is in keeping with the present tendency toward increased beam in projected designs, there have been notable exceptions in actual vessels recently completed which tend to highlight the importance of giving this factor due consideration.

Fresh-Water System

As operated prewar the *Lurline* had carried in tankage sufficient fresh water (2,869 tons) for all shipboard use, including wash, culinary, potable, and feedwater. The high-pressure evaporators originally fitted were used only occasionally for salt water while their principal use was in evaporation of raw water for distilled feed. As a result of the stability requirements noted in the previous section of this paper, the high-pressure evaporator was

removed and a "Soloshell" type low-pressure evaporator was installed in the new machinery flat aft of the engine room. The new evaporators were of two-effect type having both effects in a single shell, one effect in each end, in contrast with the smaller "Soloshell" plants having the two effects divided by a diametric baffle. The plant consisted of two complete units each capable of manufacturing 40,000 gallons per day at normal rating or 60,000 gallons per day at over-rating. All water evaporated contained ¼ grain or less impurities. The evaporators were to be operated at sea using bleeder steam from the main turbines. In general, the plant is similar in size and operating characteristics to those installed in a number of wartime P2 vessels and represents no advance in design except for the problems encountered in locating them aboard the vessel and coordinating them into the operating cycle of an existing plant. As a requirement of the Public Health Service the unit contains an automatic solenoid dumping valve which will open a line to the bilge and will dispose of the products whenever the salinity of the water exceeds ¼ grain. The pumps used for the evaporator plant are located in a well under the plant itself and are remotely controlled from the watch station on the machinery flat. A starch and compound injection system is installed which keeps the evaporators supplied with a mixture of treating chemicals whenever in operation. This process effectively minimizes the formation of scale on the evaporator coils, and the amount of manual cleaning necessary is small.

A more novel feature of the fresh-water system is the treating plant for chlorinating all water supplied to passengers and crew. The U. S. Public Health Service advised the owners prior to the reconversion that water for potable purposes under the new rules would have to be carried in tanks which had no common boundaries with any "contaminated" water surfaces; that is, tanks in which the contents could not be exposed to the ship's side nor to an adjacent double-bottom tank top. Since no tanks of this type were so installed in the vessel, this would have required the installation of extensive cofferdams in all existing tanks or the erection of new tanks in cargo or similar revenue spaces. The Public Health Service also would have required that the potable water stored in these tanks be distributed in a separate system for supplying drinking water to galleys, pantries, crew quarters, and passenger stateroom areas. All other fresh water not carried in these tanks would be required to be piped in a wash-water system, all outlets of which must be marked "unfit for drinking."

To avoid the necessity for modifying structural fresh-water tanks and of providing duplicate fresh-water systems as well as to provide a conveniently adequate supply of potable fresh water to all passenger spaces free from the psychologically disturbing effect of contamination labels, approval was obtained to substitute a permanent chlorinating system to treat all water chemically after removal from any of the ship's tanks, retain this water under treatment for a minumum period of time, and then pipe it throughout the vessel in a single fresh-water system which could be used for drinking, cooking, washing, and all other purposes. Under this system there would be no fresh-water outlets in the passenger or crew spaces marked "unfit for drinking."

The pressure-chlorination system consisted of the usual pumping facilities, a chlorine injection system, and a "retention" tank for holding the water in contact with the chlorine for a specified minimum period of time. Three 15-horsepower motor-driven fresh-water pumps, each delivering 115 gallons per minute at 265 feet head, were arranged to draw water from the structural fresh-water tanks through the existing manifold system. The pumps were controlled automatically by pressurestats set at starting pressures ranging in successive steps of about 5 pounds differential, one pump being sufficient to maintain the working level under normal light load conditions, but the second and third pumps being available to cut in automatically and successively under peak load conditions when the fresh-water demand may reach a maximum, for very short periods, as high as 1 ton per minute. Water discharging from the pumps passes through a metering system which automatically injects hypochlorite solution in quantities proportionate to the rate of water flow. The amount of solution injected is controllable, but is set to maintain approximately 2/10ths of a part of free chlorine per million of water. From the chlorine injection units the water flows to the pressure tank which is of sufficient size and strength to hold 25 tons of water to the working level under an air dome approximately 25 per cent of the volume of the water, at a pressure of 100 pounds per square inch. An internal baffling system is fitted to assure intimate mixing of the chlorination products with the water. From

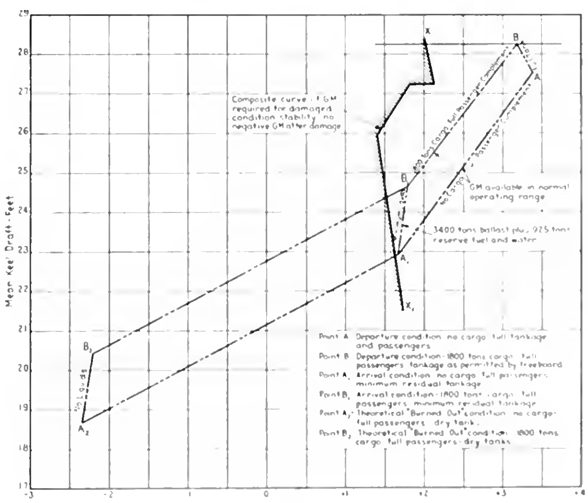

Fig. 46

the pressure tank the water is distributed directly to the fresh-water mains throughout the vessel.

Although this system requires the installation of a pressure tank in the engine room comparable in dimensions and weight to a small Scotch boiler turned on end, and although the proportioning meters for the hypochlorite add an additional piece of equipment, the scheme has worked out successfully in operation and requires very little attention from operating personnel. Cost of chlorinating solution is very nominal, and the convenience of having all water on the ship usable for potable purposes is important. The greatest drawback to the

system is the danger of over-chlorination, which can occur as a result of improper setting of the meter mechanism or due to tampering with the adjustments. A very slight increase in the amount of free chlorine makes the resultant product offensive, particularly when heated, as in making coffee or tea. However, if the limit of 2/10ths of a part per million is carefully maintained, the taste of chlorine is practically indistinguishable in the water.

Prior to the reconversion, all of the fresh-water tanks on the *Lurline* had been coated internally by the conventional cement wash process. Reports received from wartime operation of vessels using an evaporator equivalent to the new ones installed on the *Lurline* indicated that cement wash would not be a satisfactory coating for fresh-water tanks storing water evaporated in this type of plant. It was necessary therefore to scale all cement wash from those of the tanks which were to be used for this purpose and to recoat the tanks with "metallic brown" or zinc dust coatings. This is a tedious and expensive process, particularly in riveted bottom tanks, and is therefore an important point to be considered in connection with the installation of an evaporator system

Fig. 47—Top: A portion of the radio room on the "Lurline" after reconversion showing operators positions. Much apparatus, including radio telephone control console are behind camera.

Fig. 48—Bottom: The radio room before reconversion (about 1933). Only one major console is not shown due to location behind the camera. The contrast with the above indicates the advancement of shipboard electronic equipment during this period.

of this type in an older vessel.

As originally constructed, the *Lurline* contained approximately 1,325 fresh-water outlets for all passenger and crew washing facilities. During the reconversion, due to the increase in number of plumbing facilities in both crew and passenger spaces, the number of fresh-water outlets for the same purposes was increased to 2,390. This was in addition to a significant increase in fresh-water consuming conveniences in galley, pantries, laundry, and other service and engineering spaces. It might be supposed that this increase in number of outlets would have increased materially the rate of fresh-water consumption on board. In fact, such an increase was anticipated, and the size of the fresh-water pumps and piping systems was gaged accordingly. Actually, in operation, there has been no such increase in consumption as had been anticipated, and on certain voyages the consumption has been less than prewar standards would have indicated. Although the reason for this is not altogether evident, it is believed to be due partly to the physiological effect of the air conditioning, particularly in so far as the crew is concerned. It would appear that comfortable temperatures and low humidity in living and working quarters either reduce the number and frequency of baths taken or the length of time spent and the amount of water used in each bath. It also would seem that an increase in the number of outlets, although it increases the handiness and convenience of obtaining water, does not necessarily increase the over-all demands for water on a per person basis.

Electrical and Electronic Installation

During the period between the late 1920s and early 1940s radical developments had been made in the application of electricity on shipboard. Almost no other feature of ship design had developed so fast and increased so greatly as had the use of electricity. It is most fortunate that, when first built, the *Lurline* had been fitted with an adequate main electric generating plant. This consisted of four 500-kilowatt, 240-volt, 3-wire, direct-current generators driven by steam turbines and originally supplying adequate power with the use of only two of the four units. A large proportion of the engine-room auxiliaries and deck machinery, as well as galley ranges, were electrified originally. Had this not been the case, it would have been necessary to carry out an expensive and difficult expansion of the electric generating system in order to produce a ship up to modern standards of electrification, or else it would have been necessary to curtail or cancel other phases of the reconversion in order to keep within the limitations imposed by the existing plant.

In addition to a complete overhaul of the generators and generator turbines, the main generator armatures and field coils were rewound using class B in lieu of the original class A insulation. This was done in view of the expected increase in generator load and lower proportion of standby equipment as well as the relatively high operating temperatures encountered in the generator flat in the past. In addition to this precaution, a new ventilating system was installed in the generator flat both to improve the distribution of supply air and to increase the amount of exhaust capacity to assure removal of all electrically heated air directly from the coils of the generators. All switch gear units, circuit breakers, etc., on the main switchboard were overhauled. Additional switches and breakers were installed to take care of new

electric load and additional grounding and unbalance protection were provided to comply with Coast Guard requirements.

A comparison of the anticipated electrical loads, post reconversion as against prewar, indicated an increase of approximately 50 per cent on the basis of the following approximate distribution of loads (assuming maximum electric power demand at sea in warm weather with high hotel and auxiliary loads):

	Connected load in kilowatts*	
	Original	Reconverted
Steering gear and navigational equipment	65	65
Engine and boiler-room auxiliaries	381	381
Evaporators	0	51
Refrigeration	96	151
Ventilation and air conditioning	192	419
Galleys and pantries	409	470
Lighting and emergency switchboard	210	533
Miscellaneous	55	60
Total connected load	1,408	2,130
Estimated over-all load factor	0.52	5.52
Estimated service load	750	1,100

* Does not include occasional service equipment such as windlass, capstans, etc., nor standby units.

The emergency generator system originally had not been so adequately proportioned as had the main generators. The 30-kilowatt Diesel generator was entirely inadequate to meet the new requirements of the Coast Guard as regards emergency wiring, and it was necessary to obtain and install a 75-kilowatt unit to replace it. Similarly, the emergency battery capacity was nearly doubled and the emergency distribution switchboard was renewed in its entirety.

In general, all lighting system wiring throughout the vessel was renewed. Power wiring was checked for electrical and physical integrity, but the greater part of the power wiring retained except where additional load required heavier current-carrying capacity. Interior communication systems in general required new wiring throughout.

The electric lighting fixtures and fittings, except in engineering and galley spaces, were renewed throughout. Lighting fixtures originally installed in the passenger spaces were of types which could not be reused under Coast Guard rules or which would have required extensive modification to make them acceptable, and many were not in keeping with the new interior decoration nor adaptable to mounting in the new type of paneling used in the passenger areas. A careful study was made to allocate proper lighting loads to each passenger space, and every effort was made during the reconversion to keep the installed load down to the figure allocated, not only to avoid overloading of electric circuits and generators, but also to prevent overloading of the air conditioning system through electrical heating.

All stateroom lighting was of the direct type with an avoidance of ceiling fixtures in so far as possible. In the public rooms extensive use was made of cove and trough lighting in order to conform with the decortive surroundings. Although this type of indirect lighting is relatively inefficient, it was felt that the advantages to be gained in decoration warranted the additional installation and operating cost in the relatively few spaces involved. The construction of large coves which can be fitted properly on a ship with fireproof paneling and metal furring and with necessary allowance for sheer and camber and which, at the same time, will give a smooth outward appearance requires careful designing and manufacture and is a far cry from the type of construction permissable in a shoreside installation where cove lighting is attained through judicial use of lath and plaster. Coves on the *Lurline,* which are larger and more extensive than any previously used in marine work, were largely of cast-aluminum construction and, after mounted in place, were covered with cloth tightly shrunk onto the surface of the metal. Table lamps were used in lounges and reading rooms, and in a few staterooms; no floor lamps of any type were used on the entire vessel.

Those of the original electric motors which were to be retained for use in the reconverted vessel were removed from the ship, stripped, insulation washed, baked and recoated, commutators and bearings serviced, and the motors reinstalled. Examination of the majority of motors involved in this operation revealed an excellent state of preservation in spite of the many years of constant use, probably due to the high usage factor at moderate load combined with generous frame sizes and conservative capacity ratings employed in the original design in anticipation of high ambient temperatures to be encountered in tropical service. Motor controllers and distribution panels, where retained, were largely of the live-front type; those provided for new equipment were of the dead-front, totally enclosed type.

As compared with 1932 practice, there has been a marked increase in the use of telephones by the American public, and this general increase ashore is reflected in the demands made on telephone equipment and personnel on shipboard. Since the existence of a telephone in a stateroom carries with it an implied obligation to provide extensive room service, and since lower fares and fewer service personnel offered to cabin class passengers precludes giving luxury-type room service in cabin class, is was decided to eliminate stateroom telephones in cabin class and to substitute, in these rooms only, a lamp-type annunciator system. In spite of thus deleting over 20 per cent of the original number of room phones, in order to provide up-to-date service in first class rooms it was necessary to double the size of the ship service switchboard and to provide two operator positions instead of the former one in order to have adequate service during peak load hours. Because the service features involved are similar to those in a modern hotel, the use of automatic dial service was not considered acceptable and the manually operated system was retained in spite of the greater personnel requirements, and in spite of the realization that several newer vessels have been provided with dial-type equipment. The number of shoreline trunks available for port use was increased to ten and finally, by cross connection of units, ship to shore service at sea was made available to all first class stateroom telephones. The new arrangement of staterooms required rewiring all telephone circuits, and, in addition, all local instruments were renewed with integral ringer French-type phones to conserve bulkhead space and improve

(Please turn to page 76)

Fighting Fire at Sea

By CAPT. HAROLD J. BURKE, U.S.N.R.*

THE SCIENCE of naval architecture has made steady progress through the years. Ship design has been perfected to a point where, through the application of the principles of compartmentation, watertight bulkheads practically assure an unsinkable vessel.

Yet, too often, we find ships, that are capable of overcoming most of the perils of the sea, victims of fire.

Fire at sea is a serious matter. Once out of control, the result is disastrous. The history of shipping contains entirely too many accounts of these holocausts. Such tragedies as the fire in the S.S. *Morro Castle* with its great loss of life, when only about thirty miles from a safe harbor and about a mile off shore, arouses public horror. It is a tribute to the cleanliness of our ships that fires do not occur more frequently. The alertness of our seamen is a factor in handling many incipient fires successfully but, despite all this, fires at sea often do get out of control and result in the total loss of the vessel and, unfortunately, often a serious loss of life. Unlike fires ashore, one is unable to flee from fire afloat. On land it is possible to use surrounding buildings as vantage points to control fire. At sea the fire is actually in the base of operations. At sea we are alone and must be self-sufficient.

This paper is offered in the hope of focusing attention on the problem of fire protection at sea with the thought of attempting to clarify a subject shrouded in misconception and sometimes even confusion.

So far as merchant vessels are concerned, the American Bureau of Shipping rules and the Coast Guard regulations establish minimum requirements. Perhaps these requirements should be revised, particularly in respect to fire pumps and fire mains. It is the aim of this paper to indicate the advantages and disadvantages, possibilities and limitations of the various fire-extinguishing agents; to emphasize the importance of proper equipment and the necessity for thorough training, and finally to offer some practical advice on the actual extinguishment of fires at sea.

Fire-Extinguishing Agents

It is a well-known fact that no single fire-extinguishing medium will control every type of fire. It appears logical, therefore, to examine the characteristics of each fire-extinguishing agent, to evaluate its effectiveness, and to understand the limitations of each. The most common agents are water, carbon dioxide, foam, dry powder, and steam.

Water. The best known extinguishing agent is water. Usually easy to obtain and inexpensive, it is most widely used. On many types of fire its use has been satisfactory and its ability to lower the temperature of a fire below the

*Capt Burke, who is associated with the C-O-Two Fire Equipment Co., Newark, N. J., prepared this paper for presentation before the Spring meeting of the Society of Naval Architects and Marine Engineers, San Francisco. The latter part of the talk, together with comments from the floor, will appear in the next issue.

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ignition point has long been recognized.

There are several disadvantages connected with its use. These may be listed as:

(a) It is productive of a large "run-off" which in a ship might create an unacceptable free surface condition with all the attendant effects on trim and stability.

(b) The water damage may far exceed the actual fire damage.

(c) It has corrosive effect on fire mains and fittings.

(d) Pumping equipment of adequate capacity and pressure is required.

(e) In the form of a solid stream it has comparatively little heat-absorbing value because of the relatively small surface area exposed to the fire.

Water Fog. The disadvantages listed in (e) led the United States Navy in the recent war to turn to the development of equipment that would discharge water in a finely diffused homogeneous mass.

The latent heat of vaporization of one pound of water at 212 degrees F is approximately 973 Btu. Thus, if every pound of water applied on a blaze were turned into steam by absorbing the heat of the fire, 973 Btu's would be removed from the burning mass for every pound of water applied. However, because heat absorption is possible only through the surface area, it follows that a solid stream of water issuing from a 1-inch smooth-bore nozzle in the form of a solid stream will have, as a column, a theoretical surface area of slightly more than 37 square inches per lineal foot. If this same amount of water were finely diffused in the form of water fog, each minute particle would possess its individual surface area and the total area available for heat absorption therefore would be increased thousands of times, making it possible to approach more closely the optimum.

Wet Water. Water possesses an inherent surface tension which tends to limit both its surface spread and its ability to penetrate minute interstices in burning material, thus limiting its effectiveness. This surface tension causes water to bridge over pores in the texture of burning material and prevents penetration to a point where the heat of deep-seated fires can be absorbed.

Recently, wetting agents have been developed that will reduce the surface tension of water to a point where it will be comparable with that of kerosene. As a result, it is possible to obtain much greater penetration and wider surface spread. One-tenth of one per cent by volume of wetting agent mixed with ordinary water will produce an effective reduction of the surface tension.

"Wet water" for fire fighting may be available by premixing and storing for use. However, this is not a practical method for shipboard use. The use of proportioning devices which will feed the concentrate into the water stream in correct amounts is the best method to use afloat.

The general use of wet water in marine applications requires further study, research, and development. Its availability is mentioned here merely as food for thought, bearing in mind that definitely it will extinguish certain fires that plain water cannot control; for example, fires in baled cotton and in certain flammable liquids.

Carbon Dioxide. This is an excellent fire-extinguishing medium for many types of ship fires. It is discharged as a gas on the fire, and thus introduces no liquid into the vessel. It is non-corrosive and non-toxic. It will not damage even the most delicate material or machinery. It does not deteriorate, and may be stored for indefinite periods. As a non-conductor of electricity, it is safe to use around energized electrical equipment. As a gas, it can penetrate into voids and spaces in and around cargo in a manner not possible with other extinguishing media. It is probably the fastest acting extinguishing agent in common use. It is effective on Class A, B, or C fires; that is, fires generally classified as being of (A) carbonaceous matter,

(B) flammable liquids, or (C) in electrical equipment.

It appears as though there is a certain amount of confusion regarding the use of carbon dioxide on shipboard. This, therefore, appears to be a good opportunity to clarify a statement, recently published in a paper entitled "Modern Tankers" by Messrs. H. F. Robinson, J. F. Roeske, and A. S. Thaeler. In this excellent treatise the authors stated that carbon dioxide total flooding systems were removed from naval vessels because of the hazard to the ships' crews. The reason stated is slightly inaccurate and leaves an erroneous impression. These systems were removed from vessels wherein the air for combustion was taken from the space protected. Since carbon dixoide total flooding systems extinguish fire by diluting the oxygen content of the air to a point where combustion cannot be supported, it also results in inerting the air necessary for cumbustion in propulsion machinery thereby causing the ship to go dead in the water. The possibility of losing maneuverability of a vessel in time of action was a risk the United States Navy was unwilliing to accept. This led to the replacement of total flooding systems with hose reel systems which would furnish adequate gas for local application.

Heavy concentrations of carbon dioxide gas will dilute the oxygen content of the atmosphere to a point that will not support combustion. When this occurs, there is likewise insufficient oxygen present to support life which requires a minimum of 16 per cent oxygen. As a result, anyone present in an atmosphere containing insufficient oxygen would suffocate. However, ample safeguards are installed in properly designed carbon dioxide systems to eliminate life hazards. Pre-action alarms and time delay devices provide proper notice and allow sufficient time to evacuate occupied spaces before gas discharge.

The principal disadvantage to the use of carbon dioxide lies in the fact that only a limited quantity can be carried on board, thus leaving a vessel unprotected in event of successive fires. However, the United States Coast Guard regulations permit the amount of extinguishing agent required on a ship to be determined by the amount needed to protect the largest hazard and it then can be piped to all other hazards. Thus the necessity for duplicating the amount of carbon dioxide carried is eliminated.

Its great field of usefulness lies in hold protection. In the hold of a loaded ship the best equipped and best trained fire parties are helpless because of the impossibility of reaching the seat of the fire, unless, of course, it happens to occur immediately under the hatch. Built-in sprinklers would be ineffective because the cargo would shield a deep fire from the water until the hold was flooded to a height above the fire. Carbon dioxide gas, however, when discharged from a hold protection system of the total flooding type, will permeate throughout the hold and cargo, dilute the oxygen content of the air, and extinguish the fire completely, unless the cargo has inherent oxygen characteristics.

Within the past few years elaborate tests have been run by the government agencies to study the effectiveness of carbon dioxide and other extinguishing agents for shipboard fires. These tests have been divided into two parts, as follows:

1. In 1945 a Liberty ship, the Coast Guard vessel CGB49 (ex *Gaspar de Portola*) stationed at Baltimore was used in a series of test fires to determine the efficiency of carbon dioxide systems in extinguishing major fires in the machinery space bilge. The series of ten test fires was run during the period between April and October, 1945. These fires involved the ignition of "Navy Special" fuel oil distributed over the entire bilge of the machinery space, and simulated a condition more severe than would be expected to occur in normal service. As a result of these tests, the following conclusions can be drawn with respect to carbon dioxide bilge flooding systems for machinery spaces:

(a) Severe bilge fires which have been burning up to

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R. S. Neblett, assistant general manager, General Electric Co., Nucleonics Dept., which operates the atomic energy plant at Richland, Wash.


L. S. Sparrell, manager of Ship Repair Sales, Bethlehem Steel Co.

10-15 minutes' duration can be extinguished successfully by the carbon dioxide system without recourse to closure of ventilation. As these were test fires, they were permitted to burn for this length of time, but it is inconceivable that a major fire in a machinery space under normal ship operating conditions would be allowed to burn for this length of time before operating the extinguishing system.

(b) By blocking off the main inlets for the fresh air feeding the fire previous to the release of the carbon dioxide, fires of much longer duration can be extinguished successfully by the carbon dioxide system. Five test fires, ranging in burning time from 12½ to 45 minutes, were all extinguished successfully by the system, and it is believed the burning time could be extended even further with complete success.

2. In 1946, in San Francisco harbor, a very elaborate series of tests was run on a Liberty ship to study the use of various extinguishing agents on cotton fires. These tests, identified as Operation Phoebus, covered the period from May to October. Cotton was used as a cargo. A number of extinguishing agents were used, such as steam, high-pressure carbon dioxide, low-pressure carbon dioxide, and inert gas. In addition, the ship was fitted with various means of detecting fires. It can be appreciated that, in selecting cotton as the test cargo, probably the severest set of conditions was set up. Baled cotton has great heat absorbency, and also insulation characteristics, and is an extremely difficult cargo fire to extinguish completely.

While time does not permit a detailed study of results, it may well bring out that there was a total of nine tests. Some of the tentative conclusions reached from these tests were as follows:

1. Many fires in baled cotton can be extinguished completely by reducing the oxygen content of the fire-supporting atmosphere to a reasonably low figure for a reasonable length of time. Out of a total of nine test fires, six were extinguished by reducing the oxygen to concentrations ranging from 4.4 to 1.9 per cent in conjunction with soaking periods ranging from 12 to 69 hours. (Tests 1, 2, 3, 5, 8, 9.)

2. It generaly is conceded that baled cotton is one of the most difficult fires to extinguish completely. It is reasonable to expect that, for the general run of cargo fires, the test record of six complete extinguishments out of nine trials would be materially increased.

3. Even though portions of the cargo contain fire, unloading of a cargo hold full of baled cotton can be accomplished readily by working the cargo while keeping the major portion in an atmosphere containing not more than 8 to 10 per cent of oxygen. It is possible to work out the cargo safely without the aid of respiratory equipment, provided apparatus is on hand for testing the safety of the atmosphere at the working level. However, the use of respiratory equipment increases the margin of safety and also makes it possible to probe for the seat of the remaining fire and plan the unloading strategy more efficiently.

4. The ventilation openings normally present in a cargo space are large enough to allow the admission of sufficient oxygen for a fire in baled cotton to reach large proportions in a very short period of time. These openings are often so constructed, placed, or operated as to permit the spread of the fire readily to adjacent spaces. Since these tests have proved that reasonable closure immediately results in a large diminution in the severity of burning and since the complete extinguishment of a deep-seated fire by carbon dioxide, other inert gas, steam, etc., presupposes a reasonably tight closure of the openings so as to obtain and maintain an oxygen depletion for a considerable length of time, it is doubly important

that ventilation opening be arranged for quick and reasonably tight closure, and that closure be accomplished at the time of the fire.

5. Even if the detrimental effects of steam upon the value of the cargo are completely ignored, its practical use as a medium for obtaining and maintaining an oxygen depletion in the space on fire is open to serious doubt. The tests indicate that:

(a) Steaming for periods of 1, 2, 3, or 4 hours does not reduce the oxygen concentration to less than 8 to 10 per cent.

(b) Continuous steaming for 17½ hours reduced the oxygen to 3½ per cent but a large portion of this possibly was the result of burn-out from closure and not solely as a result of the steaming.

(c) When steam is shut off, an almost immediate and considerable vacuum is created in the space which causes fresh air to be drawn into the hold in considerable quantities. This fresh air increases the rate of combustion in the space, if the fire is not out at the time.

(d) The quantity of steam required to produce an inert atmosphere is larger than the steaming capacity of many vessels.

(e) Tests so far have not proved steam is an effective extinguishing agent. Even it it were proved as a control agent, unloading after such use, without the aid of other extinguishing or control media, does not appear practical.

6. An incipient fire source can exist undetected for hours, days, and weeks in large deep masses of bulk materials such as baled cotton. An inert atmosphere maintains this dormant state and, in proportion to its inertness, retards, and prevents spread. It also aids in clearing the atmosphere of smoke and heat. Upon admission of sufficient outside air, a single undetected fire source, still well insulated by the surrounding bulk, can gradually rekindle and in time cause re-ignition.

7. When unloading in inert atmosphere, tarpaulins placed over the cargo materially aid in maintaining the gas blanket thereunder, provide a good working platform, and prevent re-ignition from embers dropped from any fired cargo being removed.

8. During unloading operations, a carbon dioxide hose reel and fog nozzle equipped small water line are particularly useful for local application to allay local heat and smoke at the seat of any remaining smoldering.

These important test programs have aided materially in studying the effectiveness of shipboard fire-extinguishing equipment.

In the case of flammable liquids, carbon dioxide is remarkably fast and effective in extinguishing flame. When there is reasonable airtight integrity, it will not dissipate rapidly. Fires in machinery spaces, pump rooms, boiler rooms, and bilges are handled readily with carbon dioxide systems. Portable carbon dioxide extinguishers are remarkably effective in combating galley fires, particularly in range hoods and ducts.

Since this extinguishing agent is a non-conductor of electricity, it is of great value in the protection of electrical equipment, such a generators, motors, and switchboards, causing no damage to such equipment.

Foam. Foam for fire fighting is obtainable in two forms—chemical or powder, and mechanical or liquid.

(Here follows description of foam generators and generating methods.—*Ed.*)

Dry Chemical. A relatively new development in the field of fire-extinguishing devices is the dry chemical fire extinguisher. This consists of a steel cylinder containing a specially processed chemical in powdered form and an expellent, usually carbon dioxide, compressed in a separate cartridge, which, when ruptured, releases the gas pressure necessary to discharge the powdered chemical from the cylinder through a hose attachment. These extinguishers usually have greater range and afford a better shield to protect the operator from radiated heat. The powdered chemical may be bicarbonate of soda or a similar chemical processed with certain powdered lubri-

PROMINENT FIGURES AT SPRING MEETING

R. J. Lamont, vice president, Todd Shipyards Corp., Seattle Division.

Philip Lemler, vice president, Todd Shipyards Corp., San Francisco Division; former commandant, San Francisco Naval Shipyard.

George E. Swett, president, George Swett & Co.

Arthur Pegg, Sr., International Paint Co., Los Angeles.

J. W. Hendry, Manager, Special Products Sales, Bethlehem Steel Company, Shipbuilding Division.

H. P. Bish, manager of Aircraft, Federal and Marine Divisions, General Electric Co.

cants to provide free flowing characteristics. While these extinguishers have been found generally acceptable for shore use, little if any experience has been had aboard vessels of American registry. The Germans have been using them aboard ship for some time and with reported good results.

Equipment

Having considered fire-fighting agents, let us examine the equipment available for applying these agents and for protecting personnel engaged in fire fighting.

Oxygen Breathing Equipment. Much of the success of the Navy's fire damage control program during World War II can be attributed to the effectiveness of the self-contained breathing apparatus that was designed specifically for fire fighting. Since the principles embodied in this design were novel, they are being explained here in some length.

The idea of using the peroxides of alkali metals in self-contained breathing apparatus has held the imagination of scientists for many years, but, until the development of the Navy Oxygen Rescue Breathing Apparatus, Type A, it has never been possible to manufacture a workable unit. The Type A, which later became the Type A-1 and then, in a commercial version, the Chemox Oxygen Breathing Apparatus, used a mixture of the peroxides of sodium and potassium originally. These chemicals have the properties of doing precisely what is desired in a self-contained breathing apparatus since they evolve oxygen, remove carbon dioxide, and retain exhaled moisture. Thus, adequate oxygen, dry and free from carbon dioxide, is inhaled insuring complete respiratory protection in any atmosphere with clear lenses in the facepiece of the apparatus.

Actually, what occurs is that the wearer exhales into the canister containing the peroxide, where free oxygen is liberated, and a hydroxide formed by the action of the exhaled moisture. The second reaction between the hydroxide and the exhaled carbon dioxide produces a carbonate leaving the oxygen freed from the carbon dioxide. Continued laboratory and field investigations indicated that the mixed peroxides of sodium and potassium were not as efficient as potassium tetroxide alone; hence, the Chemox Oxygen Breathing Apparatus now uses this chemical.

Na_2O_2 (sodium peroxide) contains 146 cubic centimeters per gram available O_2 (STPD), while K_2O_4 (potassium superoxide) contains 236 cubic centimeters per gram available oxygen under the same conditions. Therefore, K_2O_4 is used now, since it will evolve more oxygen than a mixture of the N_2O_2 and the K_2O_4. In addition, a copperoxychloride catalyst is added to the bottom layer of the chemical in a small quantity to hasten the reaction. Actually, it is not possible to obtain all this oxygen for respiratory purposes, but sufficient is evolved to insure a minimum service life in the apparatus of 45 minutes at hard work. The United States Bureau of Mines has extended to the Chemox Oxygen Breathing Apparatus approval 1307 against the exacting requirements of Approval Schedule 13C for a period of 45 minutes.

The canister is made up of five layers of chemical with the bottom layer (which first reacts with the exhaled breath) containing the catalyst mixed with the K_2O_4. Extensive investigation has shown that the maximum efficiency is obtained with this construction. The chemical is prepared and packed under carefully controlled conditions of humidity and each canister is fluoroscopically inspected to insure optimum performance.

The canister weighs approximately 4 pounds and the complete apparatus with canister inserted approximately 13½ pounds, thus producing the highest and most efficient self-contained breathing apparatus now available.

Equipment as described in the foregoing, or equal to it, is necessary for the use of shipboard fire parties, if the smoke barrier attendant at all fires and particularly those

in the relatively confined spaces below weather decks is to be overcome successfully.

All-Purpose Nozzle. Another piece of equipment which rendered uniformly effective service in naval shipboard fire fighting was the all-purpose nozzle. So named, because it was capable of furnishing water in the form of a solid stream, water in the form of fog, or shutting off the flow of water entirely, it became standard fire-fighting equipment. The fire fighter using this nozzle could select instantaneously any one of the three conditions.

It has been stated under the heading of "Water Fog" that water discharged in this form has the highest possible heat-absorbing properties; with such equipment to protect the fire fighter from the heat, and satisfactory breathing apparatus to protect him from the smoke, he has at least a better than even chance of being able to live safely in the presence of a shipboard fire and to fight it successfully.

Portable Oxyacetylene Cutting Apparatus. Every properly equipped fire party should be furnished with a portable oxyacetylene cutting outfit. This type of equipment is invaluable for cutting away debris or for cutting holes through steel decks for the application of fire-fighting agents from directly above a compartment on fire. Under the section on "Fire Fighting Technique," which follows later, the necessity for this type of portable cutting equipment will be discussed in more detail.

Fire Clothing

Boots. Fire parties should be provided with special fire clothing to protect them while fighting fire. The first item to consider should be the proper design of the boots. During the war a special fire-fighting boot was developed for the United States Navy which gave very satisfactory results. This boot had a non-slip, "squeegee" type of sole, which permitted the wearer to have a reasonably secure footing even on oil-covered steel decks. This particular boot had a metal reinforced toe and a steel heat-insulated inner sole which prevented puncture wounds to the foot and also provided some heat insulation against the conduction from hot decks.

Helmet. A light plastic helmet should be provided for each member of the fire party to guard against head injuries which otherwise might develop in smoke-obscured spaces.

Gloves. Gloves should be furnished for each member of the fire-fighting party for the very obvious purpose of preventing painful although not serious burns around the hands and wrists. These gloves may be of leather, lined wtih wool, or of other design suitable to provide heat protection, and it is recommended that they be furnished with gauntlets.

Heat Shields. A certain number of heat shields that may be attached to the helmet should be furnished to permit fire fighters to maintain positions under extreme heat conditions. Recently a very satisfactory screen-type shield has been perfected. When shields are used, snoods or hoods of heavy wool should be furnished also to protect the wearer's ears and neck from heat. This may be an appropriate place to dispel the false impression that asbestos suits provide complete protection for a fire fighter. Nothing could be further from the truth. An asbestos suit may protect the wearer from flame for a minute of two. It certainly does not give any prolonged heat insulation. Furthermore, if they are hot and are struck with a water stream, water penetrating through the fabric will result in the generation of steam on the interior of the suit and fatalities have occurred from this cause. Asbestos suits give a false sense of security and in practical fire fighting they are not nearly as effective as heavy woolen garments while at the same time they are much more cumbersome.

Waterproof Coat. Generally speaking, any foul weather gear will be satisfactory to protect the fire fighter

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AT THE SPRING MEETING

V. W. Hoxie, ex-manager, Marine Dept., C. C. Moore & Co.

from water discharged in fire-fighting operations.

Miscellaneous. The fire damage control locker also should include battery-type hand lanterns for emergency illumination, forcible entry tools, extra rolled up lengths of hose, nozzles, a mine safety lamp to determine quickly the oxygen content of the space, an explosimeter to record the explosive characteristics of an atmosphere, an inhalator, and portable first aid appliances.

Pumps

Proper pumping capacity for fire-fighting purposes aboard a ship should be one of the primary concerns of the naval architect. Generally speaking, reflection upon the problem will indicate that the pumping capacity of most of our ships is too low in volume and pressure. The production of a good water fog pattern requires a nozzle pressure of about 60 to 100 pounds per square inch. Friction loss through piping and hose in addition to the static head have to be overcome. Hence it is evident that fire pumps have to be pretty substantial. Furthermore, the capacity of these pumps should be adequate for about six streams at about 150 gallons per minute each on each deck level simultaneously and in addition thereto provide sufficient water for any other water needed for fire protection-equipment.

In addition to the ship's regular fire pumps, every vessel should be equipped with a separate Diesel-driven fire pump capable of furnishing at least 1,000 gallons of water a minute at a pressure of 125 pounds per square inch. This pump, for emergency purposes only, should be located as far forward as possible and should have its own sea chest. An independent vertical fire main riser with a manifold of six 2½-inch hose valves on each deck level should be installed for this pump. The necessity for furnishing such an independent fire pump lies in the fact that, during a fire, vital engineering spaces may become involved in the actual fire, or conditions may force the crew to abandon them, and thus prevent the proper operation of auxiliaries such as fire pumps. The fact that some vessels may have emergency Diesel generators and electrically driven fire pumps does not alter the desirability for the independent Diesel-driven fire pump, since all of the machinery spaces, including the auxiliary flats, may become untenable during a fire.

As the extreme bow of the ship is usually tenable during a fire, it is to this point that crew members and passaengers are often driven during a fire and it therefore follows that the bow of a ship affords a reasonable base for fire-fighting operations if all other designed protection is useless.

In this respect, it is significant to note that the U.S.S. *Franklin,* when bombed close to the shores of Japan during World War II, was dead in the water for a period of time. All of her auxiliary machinery was inoperable except a Diesel-driven emergency fire pump located well forward. This engine, supplied by a built-in 50-gallon tank of Diesel fuel oil, continued to operate and furnished fire streams until the engineering plant could be restored to operation. It was a big factor ultimately in saving the ship.

Next to the bow location, the extreme stern is probably the safest point on a ship during a fire, particularly if the vessel retains any maneuverability.

The item of proper fire pumps for a ship is of utmost importance. A reasonable factor of safety should be calculated and included in the specification, bearing in mind that time will cause deterioration in fire mains and piping and that this in turn will result in increased friction loss.

Fire Mains. The proper design and proportioning of fire mains is an important feature of ship design. The use of 90-degree elbows and sharp bends should be avoided in the interest of limiting friction loss. The interior fire mains are subject to rapid obstruction by sea growth, tuberculation, and scale. In certain sections of the world this condition is more aggravated than in others. During the late war, clogging of fire mains became quite a problem aboard naval vessels operating in the South Pacific. To prevent rapid deterioration of fire mains, the United States Navy resorted to treating their interior with a plastic coating with highly satisfactory results.

Too often a fire main in a vessel of adequate dimensions at the time of installation but in a very short time

SOUTHERN CALIFORNIA COMMITTEE MEMBER

Karl French who, as chairman of the Southern California Section, represented his district on the Steering Committee.

may become fouled to such an extent that the effective waterway is reduced to less than a quarter of its original size. This will result in inadequate streams for fire fighting.

All hose valves, checks and similar fittings used in fire mains should be fabricated from material not easily corrodible. This rule is well recognized.

Fire Hose. Fire hose furnished for shipboard use should be rubber-lined, double-jacketed canvas. Hose for weather decks and intended for use in the superstructure may be 2½ inches, while hose intended for use below the main deck or in small compartments or staterooms in the superstructure should be 1½ inches in size. Hose valves preferably should be 2½ inches throughout the vessel, but where 1½-inch hose is used below the main deck or in fairly small spaces, a two-way gate should be attached to the 2½-inch hose valve outlet so that will supply two 1½-inch hose lines. The nozzle reaction from a stream discharged from a 2½-inch hose line would be so great that maneuverability is affected seriously and it becomes almost impossible for an individual to operate such a hose stream satisfactorily, particularly on the deck of a ship at sea where the rolling and pitching of the vessel will affect further the fire fighters' stability. However, the stream from a 1½-inch hose can be handled easily by a single fire fighter under almost any condition and the use of the smaller hose will afford greater flexibility and maneuverability.

The fact that a second hose is available insures against burst hose and affords a back-up line in case of emergency; it also permits a fire to be attacked from two angles simultaneously.

All hose should be stowed close to the hose valve outlet and should be kept disconnected so that if there is leakage through the valve the hose itself will not become filled with water.

All fire hose couplings should be of brass and the threads should be oiled lightly to facilitate coupling. Care should be taken not to get the oil on the rubber gasket which is furnished with such couplings.

Smoke Detectors and Fire Alarms

Early discovery of a fire is of prime importance, if successful fire fighting is to be accomplished. If a fire is discovered while it is still in the incipient state and if such a fire can be reached with the proper fire-extinguishing equipment, there is little or no trouble. Invariably the serious fire losses at sea are those fires which have not been discovered quickly and which, reaching dangerous proportions, overpower and overtax the ability of the fire brigade.

To facilitate early discovery of fire and to transmit an alarm, effective smoke detectors have been devised. These devices draw air samples from holds or other spaces and constantly analyze it. When smoke is present in the air sample, an alarm is given which generally is both audible and visual. Many of these smoke-detecting systems can be used in connection with carbon dioxide fire-extinguishing systems. The piping which is used to convey the air sample to the detector cabinet can be used also to convey carbon dioxide gas from banks of cylinders to the space protected. All that is required are direction valves which will close off the passage of air samples to the detector cabinet and route instead carbon dioxide gas to the affected space. Of course, upon receipt of an alarm from the smoke detector, it should be announced on the ship's alarm system and the fire parties should go into action. Smoke-detecting systems are particularly important for holds and unmanned spaces.

For occupied spaces, such as passenger quarters and crew quarters, electric fire alarm systems should be installed which function in much the same fashion as interior fire alarms do in a building ashore. The fire alarm system consists of thermostats located on the overhead of the protected areas, usually termed zones, and an annunciator panel in the wheelhouse. Operation of one or more thermostats or the manual station in a zone causes appropriate alarms to sound in the zone affected, in the engine room and in the wheelhouse. Simultaneously, a signal on the annunciator panel appears which indicates visually the affected zone. Some types are supervised open-circuit thermostat systems and other types are closed-circuit systems. Breaking of a wire leading to the thermostats on an open-circuit system will cause a trouble signal to be given at the annunciator panel. Breaking of wire on a closed-circuit system would cause an alarm to sound as though fire were actually present.

Fire Lockers

Every ship should set aside adequate locker space for stowing fire-fighting equipment. These lockers should be arranged with shelves and suitable holders to secure equipment and prevent it from being damaged through tossing about. A check-off list should be maintained in connection with each of the fire equipment lockers and, in the event of fire, it is at these lockers that the various fire parties should assemble.

One of the ship's officers should be in personal command of each fire party and by reference to the check-off list and previous training make sure that the proper equipment goes forward with each fire party.

These lockers should be well lighted and ventilated and their location by deck and frame space should be well established by indicating signs. All of the fire-fighting gear should never be stocked in a single locker because in this case there is a possibility that fire may prevent reaching such a location or fire may destroy the equipment in the locker. It is far better practice to have fire equipment dispersed in lockers throughout a vessel —one locker well forward, one probably amidships, and the third well aft. Because of this dispersal, it is highly unlikely that all fire gear lockers will be knocked out at the same time.

Construction Features

While construction features cannot be considered properly within the scope of this paper, certain features are so vital and so important that they cannot be overemphasized. Modern naval design should give due consideration to the principles of fire-resistive and fire-protective construction and every effort should be made to insure the proper protection of vertical arteries, installation of proper draft stops and fire bulkheads. Fortunately, the necessity for self-closing or automatic doors is well recognized, but not so obvious is the fact that concealed spaces, particularly in passenger vessels, provide arteries through which fire may travel undetected where it cannot be reached by water from hose streams.

(Please turn to page 102)

Automatic Steering of Ships By Proportional Control

By LEONARD I. SCHIFF and MARVIN GIMPRICH

The following is an abstract of the paper presented at the Spring meeting of the Society of Naval Architects and Marine Engineers in San Francisco, May 12, 1949.

Leonard I. Schiff

THIS paper represents a continuation of earlier work that dealt with the course-keeping qualities of ships. In that work, the dynamic stability of an unsteered ship was related to the distance traveled by the ship, following a disturbance, before it returns to a straight course. The greater the dynamic stability, the shorter the distance required to re-establish straight course.

In the present paper, this concept of stability is extended to steered ships. The directional stability of a steered ship is related to the distance traveled by the ship, following a disturbance, before it regains the heading on which it is being steered. It is assumed that some type of automatic steering device applies corrective rudder to reduce any deviation from proper heading. It is apparent that the amount of directional stability will depend on the properties of the control system as well as those of the ship. In general, however, it is found that the ships that have the greatest degree of dynamic stability when unsteered also have the greatest amount of directional stability when steered with a standard control of simple design.

These points are examined quantitatively by making an analytical study of the motion of three representative ships and of the behavior of several types of control systems. Controls which apply corrective rudder in proportion to the heading error alone, and in proportion to a combination of heading error and rate of change of heading error, are considered in detail. The effects of time lags in the motion of the rudder and within the control system itself are also taken into account. A great many results are obtained and presented in graphical form

It is concluded that a ship that is quite stable dynamically when unsteered, can be steered satisfactorily by a simple control in which only the heading error is taken into account. A ship that has only a small amount of dynamic stability, or is actually unstable, requires in addition some inclusion of rate of change of heading error in the steering control, in order to obtain satisfactory performance.

The Authors

Dr. Leonard I. Schiff is professor of physics and executive head of the Physics Department of Stanford University. From 1937 to 1940 he was a National Research Council Fellow and Research Associate in Physics at the University of California and the California Institute of Technology. From 1940 to 1947 he was at the University of Pennsylvania and was associated part time with the Columbia University and University of California Divisions of War Research between 1941 and 1945. During part of 1945-46 he was on leave of absence as a staff member of the Los Alamos Scientific Laboratory in New Mexico, and he has been a consultant to the Experimental Towing Tank, Stevens Institute of Technology since late 1944. He became associated with Stanford University in 1947.

He is the author of a number of technical papers on various aspects of theoretical physics, and of the book "Quantum Mechanics".

Mr. Marvin Gimprich is consulting physicist to the Experimental Towing Tank, Stevens Institute of Technology, and Hydrodynamics Laboratory, California Institute of Technology. He is also guest lecturer at Stevens Institute of Technology Graduate School. In 1943 and 1944 he was a lecturer in Physics at Columbia University, and from 1944 to 1946 was associated with the Columbia University Division of War Research. He has been associated with Stevens Institute of Technology since 1945. He is the author of a number of technical papers on various topics in fluid dynamics.

Stability of the Tuna Clipper

Part IV

By DAVID W. DICKIE

THE Curves of Form have to be adapted to the Tuna Clipper problem on account of the excessive change of trim. For the purpose of illustrating the effect of change of trim when using the Curves of Form of the January 1947 article in the *Pacific Marine Review,* a somewhat elaborate procedure was resorted to. The method is not used commercially after a knowledge is gained as to the general direction from the calculated curves the true data lies.

Ordinarily the question would be raised: Are the vessels working so close to the danger line that it is necessary to give consideration to fine details in the calculations?—and the answer is yes. Bear in mind that the vessels are practically finished before they are offered for insurance and then it is too late to do very much about it. Some vessels have been refused insurance by one group of underwriters only to operate for a year before they meet the situation that causes disaster. The vessels cost from $250,000 to $500,000 which means several years insurance premiums when a loss occurs.

When Anthony Martinolich designs a vessel he aims to keep the drawings close to a standard size. To do this he had scales made in between the standard commercial scales,—i.e., $\frac{3}{16}''$, $\frac{5}{16}''$, $\frac{7}{16}''$, $\frac{5}{8}''$ and $\frac{7}{8}''$ equals one foot. The writer changed the original lines from $\frac{5}{16}''$ to $\frac{1}{4}''$ equals one foot before making the calculations and introduced a waterline between those shown on the drawing to offset any lack of accuracy due to working from the small scale. It would have been better to have made the lines drawing to a scale of $\frac{1}{2}''$ equals one foot for the sake of accuracy but making cuts from oversize drawings introduces another problem.

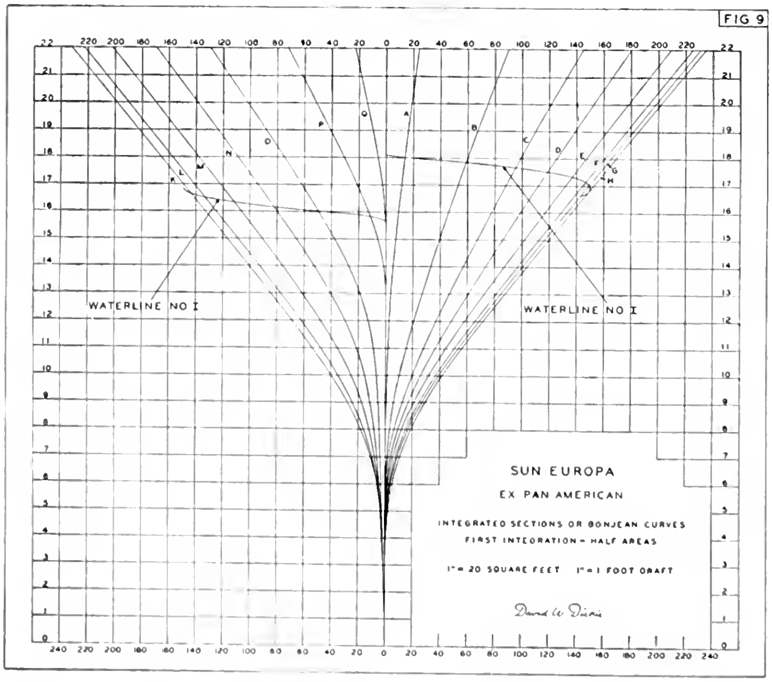
As was explained in the January 1947 article, when making the Curves of Form, each waterplane is integrated as a separate entity and subsequently the vertical integration is made in the Combination Table just below the water plane integration.

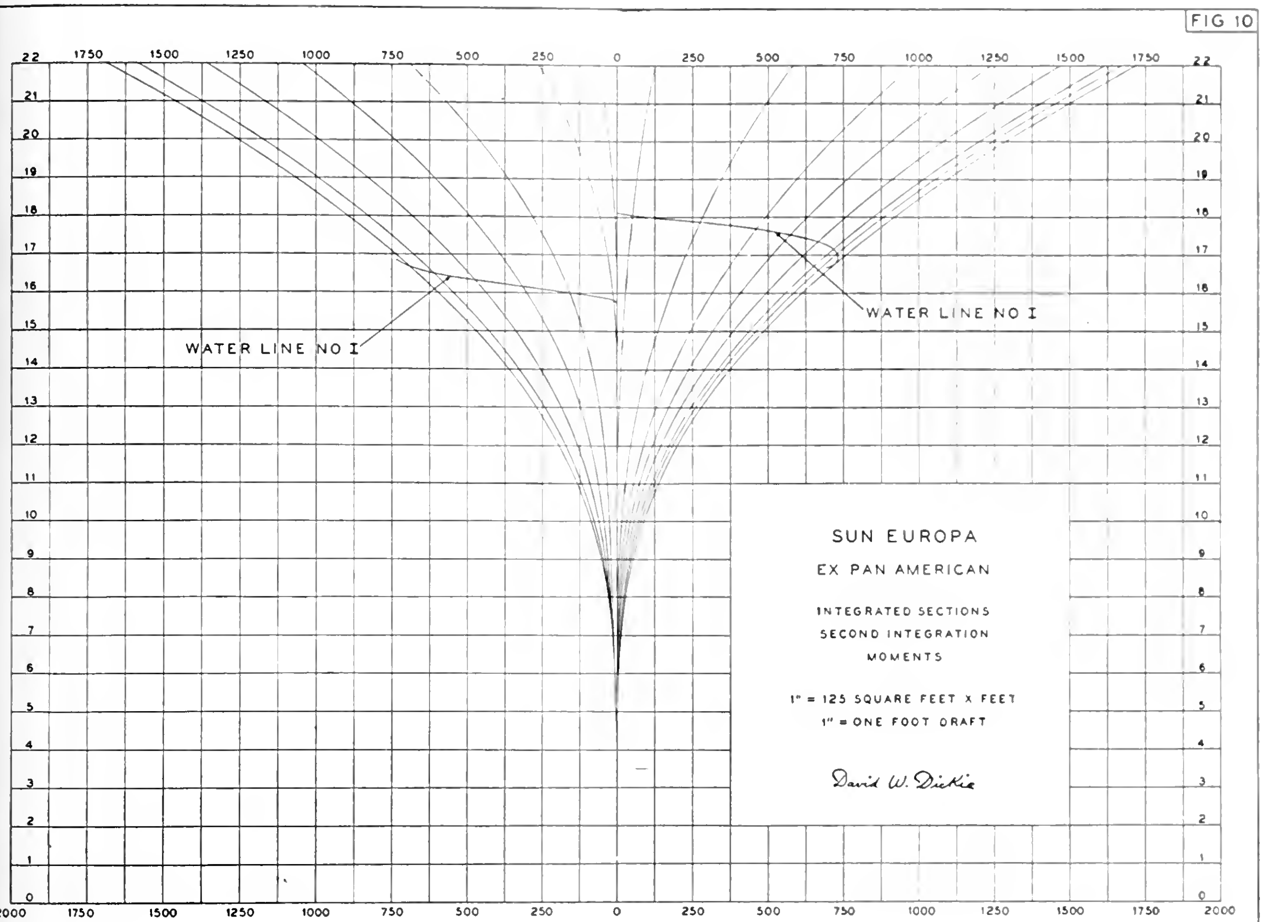
The analysis of the effect of excessive trim was made by dividing the body plan into waterplanes one foot apart. The ordinates were lifted on each section and integrated vertically on the adding machine by means of the trapezoidal rule. The Integrated Sections or Bon Jean Curves are shown on Figure 9. (Figures 1 to 8 have appeared in previous articles. Ed.)

The Second Integration was made direct from the adding machine tape of the First Integration by treating the waterplane results as if they were ordinates from the First Integration Curves. The Moment Curves are shown on Figure 10 and the scale of both sets of curves was changed to make the corrections required by the use of the trapezoidal rule. The Sum of the Moments divided by the Sum of the Areas at any particular Waterplane gives the distance of the Center of Buoyancy below the waterplane, and obviates the necessity of correcting for the trim at the base line.

An accurate longitudinal integration of the areas and moments can only be made at the particular waterplane where the stations are spaced to suit the rule. Any departure from the correct spacing introduces an error. The sections of the body plan in this instance are spaced to fit the 19 foot waterplane (Waterline Number 7) and the comparison between the vertical and

FIG 9





longitudinal Combination Integration is shown on Figure 11.

FROM THE CURVES OF FORM	
Draft Forward	19′0″
Aft	19′0″
Mean at Center of Flotation	19′0″
Displacement Cubic Feet	35155.21
Displacement Tons (2240 pounds)	1004.435
Center of Buoyancy above Base (feet)	13.547
Center of Buoyancy forward of (H) (feet)	2.214
FROM THE INTEGRATED SECTIONS	
Draft Forward	19′0″
Aft	19′0″
Mean at Center of Flotation	19′0″
Displacement Cubic Feet	35127.7
Displacement Tons (2240 pounds)	1003.648
Center of Buoyancy down from the 19′0″ waterplane feet	5.43
Center of Buoyancy above Base (feet)	13.57
Center of Buoyancy forward of (H) (feet)	2.144

The Integrated Section method only gives the Volume, vertical position of the Center of Buoyancy and the longitudinal position of the Center of Buoyancy. The Metacenters and other data have to be calculated in the usual manner from the waterplanes which happen to be identical in this illustration. The two calculations check each other very closely indeed when the small scale of the lines drawing is taken into account. Since the ordinates for the second Integration were taken from the adding machine tape, they have to be divided by two.

The actual freeboards and the

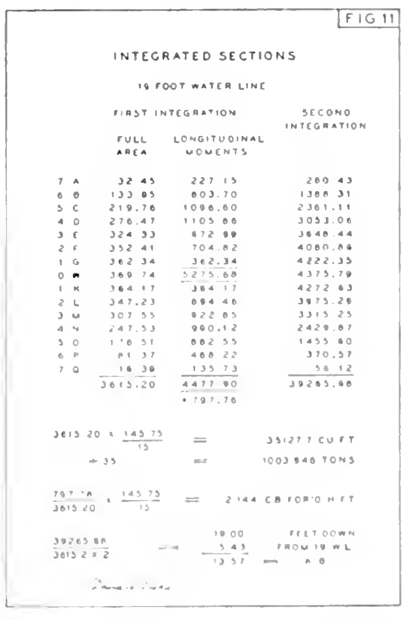


FIG 11

INTEGRATED SECTIONS

19 FOOT WATER LINE

		FIRST INTEGRATION FULL AREA	FIRST INTEGRATION LONGITUDINAL MOMENTS	SECOND INTEGRATION
7	A	32 45	227 15	280 43
6	B	133 85	803.70	1388 31
5	C	219.76	1098.80	2361.11
4	D	276.47	1105 88	3053.06
3	E	324 33	972 99	3648.44
2	F	352 41	704.82	4080.86
1	G	362 34	362.34	4222.35
0	H	369 74	5275.68	4375.79
1	K	364 17	364 17	4272 63
2	L	347.23	694 46	3975.28
3	M	307 55	922 65	3315 25
4	N	247.53	990.12	2429.87
5	O	178 51	882 55	1455 60
6	P	81 37	488 22	370.57
7	Q	16 30	135 73	56 12
		3615.20	4477 90	39265.68
			+ 797.76	

$3615.20 \times \frac{145.75}{15} = 35127.7$ CU FT

$\div 35 = 1003.648$ TONS

$\frac{797.76}{3615.20} \times \frac{145.75}{15} = 2.144$ CB FOR'D H FT

$\frac{39265.68}{3615.2 \times 2} =$ 19.00 − 5.43 = 13.57 FEET DOWN FROM 19 WL ← A B

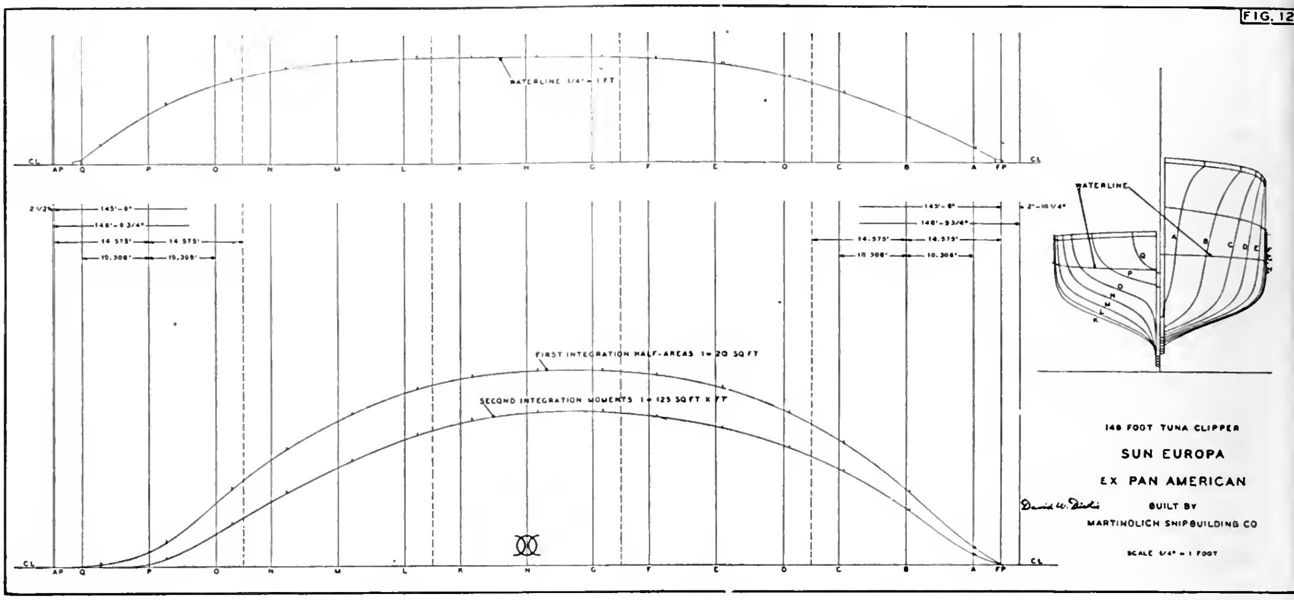


FIG. 12

corresponding drafts for Trim Line I lifted at the time the inclinations were made, were laid off on the Body Plan, the First Integration and the Second Integration Curves. The Ordinates were lifted and faired longitudinally giving the Waterplane, the Curve of Sectional Areas and the Curve of Moments as shown on Fig. 12.

The Body Plan shown on Fig. 12 is the same as that shown on the Lines Plan excepting that the regular waterlines have been omitted and Trim Line I has been drawn on just as it was lifted from the ship. The part at the upper left is a plan of one half of the waterplane taken from the body plan and laid off on the longitudinal spacing of the ordinates. The part at the lower left is a plan of the ordinates lifted from the Integrated Sections or Bon Jean Curves shown on Fig. 9 and a plan of the ordinates lifted from the Section Integration Curves shown on Fig. 10, both of these laid off on the longitudinal spacing of the ordinates.

The regularly spaced ordinates shown on Fig. 12 were then abandoned and the faired curves were redivided longitudinally between the actual end points according to Tchebycheff's spacing and the detail calculations for Trim Line I were made as shown on Fig. 13. These calculations give the true displacement and all the other data

FIG 13

INCLINATION NO I WATERLINE LENGTH 143.0417 FEET

CENTER 1.66 FEET FORWARD OF MIDSHIP POINT DRAFT TO CENTER OF FLOTATION 16'–9 13/16"

	FIRST INTEGRATION HALF AREAS	FIRST INTEGRATION LONGITUDINAL MOMENTS	SECOND INTEGRATION		A HALF ORDINATES	B 1/2 ORDS X LEVERS	D 1/2 ORDS X LEVERS²	C ORDINATES CUBED
7 A	12.5	87.5	46	7 A	2.14	14.98	104.88	9.800
6 B	55.5	333.0	258	6 B	6 85	41.10	246.60	321.419
5 C	93.5	467.5	448	5 C	10.71	53.55	287.75	1228.481
4 D	118.6	466 4	563	4 D	13.16	52.64	210.56	2279.122
3 E	135.7	407.1	656	3 E	15.03	45.09	135.27	3395.291
2 F	145.7	291.4	711	2 F	15.93	31 88	83.72	4042.475
1 G	149.3	149.3	738	1 G	16.24	16.24	16.24	4283.099
0 N	149.7	2197.2	738	0 H	16 36	255.46	0.00	4378.747
1 K	145.3	145.3	697	1 K	16.39	16.39	16.39	4402.880
2 L	138.1	272 2	629	2 L	16 30	32.60	65.20	4330.747
3 M	118.9	350.7	505	3 M	15.62	47.48	142.38	3959.309
4 N	89.9	359.6	352	4 N	14.70	58.80	235.20	3178.523
5 O	59.5	297.5	202	5 O	12 92	64 60	323.00	2156.689
6 P	18.8	111 6	38	6 P	9.11	54 66	327.96	756.058
7 Q	1.8	12 6	0	7 Q	2.88	20.16	141.12	23.868
	1426 6	1549 5	8577		184.54	294 67	2296.25	38744.528
		DIFF + 647.7				DIFF – 39.21		

$1426.6 \times 2 \times \frac{143.0417}{15}$ = 27208 CU FT

÷ 35 = 777 384 TONS

$\frac{647.7}{1426.6} \times \frac{143.0417}{15}$ = + 4 33 C.B. FOR'D H FT

+ 1.66 FOR'D MIDSHIP

+ 5.99 C.B FORWARD OF MIDPOINT

$\frac{8577}{1426.6}$ = 16 62 DRAFT AT C.F.

4 61 FEET DOWN

12.21 = K.B.

$184.54 \times 2 \times \frac{143.0417}{15}$ = 3519.588 SQ FT

$\frac{3519.588}{420}$ = 8.38 TONS PER INCH

$\frac{-39.21}{184.54} \times \frac{143.0417}{15}$ = – 2.026 C.F AFT H FT.

+ 1 66 FOR'D MIDSHIP

CENTER OF FLOTATION AFT OF MIDSHIP –.366 FEET

$\frac{(\text{DIFF COL B})^2}{\text{COL A}} = \frac{(-39.21)^2}{184.54} =$ COL D 2296.25 – 8.33 = 2287.92

$2287.92 \times 2 \times \left(\frac{143.0417}{15}\right)^3 =$ LONG. I 3988120

$\frac{3988120}{27208.43}$	= LONG BM	=	145.0415
	ABOVE BASE KB	=	12.2074
	LONG KM	=	158.0489
	KG	=	18.932
	LONG GM	=	139.1169

$\frac{139.1169 \times 777.384}{143.0417 \times 12}$ = MOM TRIM 1" = 63 FT TONS

$38744.528 \times \frac{2}{3} \times \frac{143.0417}{15} =$ TRANS I 246314.73

$\frac{246314.73}{27208.43}$	= TRANS BM	=	9.0520
	ABOVE BASE KB	=	12.2074
	TRANS KM	=	21.2603
	FROM INCLINATION GM	=	2.328
	RESULTANT KG	=	18.932

David W. Dickie

	From the Curves of Form	*From the Integrated Sections*
Draft Forward	18'1$\frac{7}{8}$"	18'1$\frac{7}{8}$"
Aft	15'7"	15'7"
Mean at Center of Flotation	16'9$\frac{13}{16}$"	16'9$\frac{13}{16}$"
Displacement Cubic Feet	27212.5	27208.4
Displacement Tons (2240 pounds)	777.5	777.38
Center of Buoyancy above Base (feet)	12.32	12.21
Metacenter above Buoyancy (feet)	9.09	9.05
Metacenter above Base (feet)	21.41	21.26
Moment to Trim One Inch (foot tons)	64.8	63.0045
Tons per Inch Immersion	8.48	8.38
Center of Flotation aft of (H) (feet)	1.74	.336
Center of Buoyancy forward of (H) (feet)	6.084	5.99

which is compared with the results taken from the Curves of Form. Again it must be remembered that the data taken from the Second Integration Curve when divided by the data taken from the First Integration Curve gives the distance down from the waterline.

The above results prove that for a vessel with a cruiser stern the Curves of Form made for the vessel at the designed trim are sufficiently adequate to be used with changes of trim up to three feet down by the head and three feet down by the stern from the designed trim. In the case of the tuna vessel with the wide transom stern this is not true.

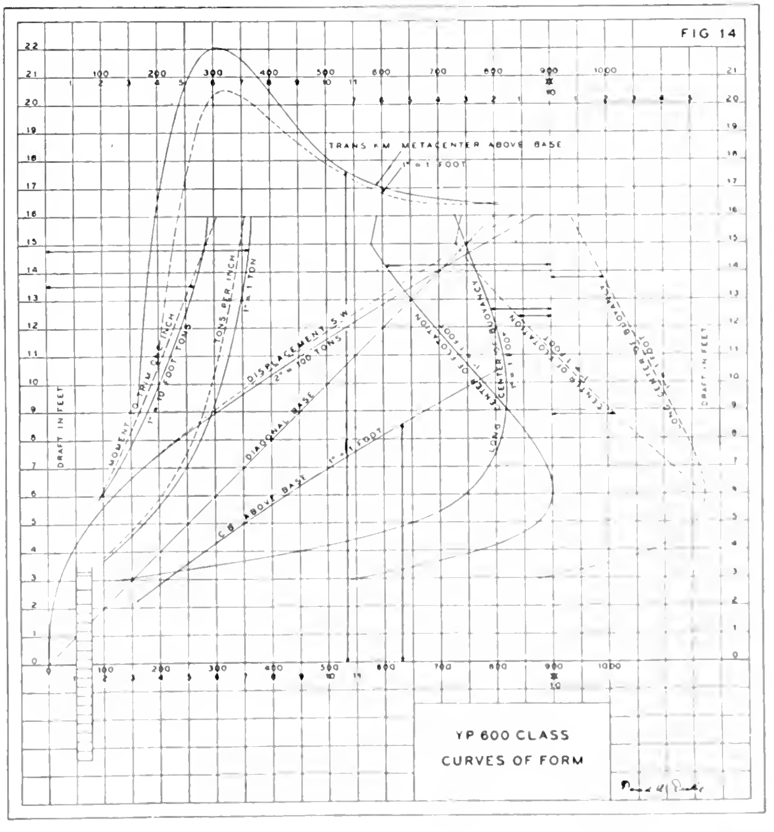
On the vessel of the illustration 2'-6$\frac{7}{8}$" change of trim in a waterline length of 143 feet is about 1° 1'50" and even at this small angle the Center of Flotation shows an error of longitudinal position of 1.374 feet. The writer attempted to devise a method for correcting the error but the result was too difficult to be used practically. It will be noticed, however, that the error approximates very closely one-half the change of trim, and for small angles this is generally true.

As an illustration of the change that takes places when the Curves are made with the waterline parallel to the keel and with the waterline parallel to the waterline at which the vessel floats, the curves for the Y P 600 Class vessels are shown, Fig. 14. The full line Curves are for the vessel down by the stern in fishing trim and the dotted lines are for the vessel as designed.

For a short time we used the Bureau of Ships Curves but the results were not coming out as expected. This led to remaking the Curves to the fishing trim with the following results: It must be borne in mind that the Bureau's Curves were checked by Mr. L. E. Geary when the discrepancy was discovered and that the Bureau Curves have an additional calculation to correct the error.

Note that the displacement is 28.5 tons more than the Bureau's Curves—the Center of Flotation 3.08 feet aft of the Bureau's Curves—and the Longitudinal Center of Buoyancy is 4.42 aft of the Bureau's

	From the Curves of Form	*From the Bureau Curves*
Draft Forward	10'10"	10'10"
Aft	16'8½"	16'8½"
Mean at Center of Flotation	14'0"	14'0"
Displacement Cubic Feet	24412.2	23415.2
Displacement Tons (2240 pounds)	697.5	669.0
Center of Buoyancy above Base (feet)	9.30	9.30
Metacenter above Buoyancy (feet)	7.30	7.12
Metacenter above Base (feet)	16.60	16.42
Moment to Trim One Inch (feet)	5.43	5.31
Tons per Inch Immersion	7.12	6.77
Center of Flotation Aft of (H) (feet)	5.75	2.67
Center of Buoyancy Aft of (H) (feet)	2.67	
Center of Buoyancy Forward of (H) (feet)		1.75



Curves at 14 feet Draft.

The significance of this is that when the draft is taken to the Center of Flotation—which brings the point even higher on the Displacement Curve—it gives a greater displacement, which, when divided in the formula

$$\frac{w \times d \times 1}{W \times a} = \text{G M feet}$$

gives a smaller metacentric height. This is the problem confronting the crew of the tuna boats.

The reason for the difficulty with the steering of the vessels is that they are not fair aft. It is only necessary to plot the curve of Sectional areas with the boat floating at fishing trim to see this. An effort has been made to correct the trouble by attaching a skeg to the stern on each side about one-quarter of the beam out from the center line.

Lurline

(Continued from page 61)

room appearance, in contrast to the previous installation with bulkhead mounted ringer boxes.

In addition to complete renewal of the Coast Guard required emergency announcing system, a separate but extensive combination general announcing, radio entertainment, and public address system was provided during the reconversion. Because of the extent of this system, a sound distribution central control room was provided located for convenience adjacent to but separate from the sound motion picture booth on the boat deck. This system permits paging in all foyers and public rooms, crew's quarters, etc., from selected locations, provides radio entertainment simultaneously on any one of four broadcast channels to all public rooms, certain passenger staterooms and all crew and officers' rooms and crew messrooms, permits distributing announcements or music from either disk recordings or wire recordings to the same outlets, and provides means for broadcasting ship's entertainment features through the radio room to shoreside stations for relay to national network facilities. There is a considerable degree of flexibility in selection of these functions or in simultaneous performance of various operations over different sections of the distribution system. Aside from the more obvious advantages of this system, it has been notably helpful in eliminating the previous practice by which crew members used their own radio equipment, cluttering the ship with a maze of antennae, and at the same time has provided better reception for the crew than would be possible with privately owned sets. The operation of these entertainment receivers is remote from the radio room and involves no interference with the ship's radio operating personnel.

The radio communication equipment originally provided on the *Lurline* in 1932 had developed and increased over the years up to and during the war in keeping with developments in the field. During the reconversion, all radio equipment was removed from the ship, the radio room relocated, and some equipment extensively modified before reinstallation in the new location together with the various items of new equipment. As previously mentioned, facilities were provided for interconnecting the radio telephone with the ship's service phone system. Radio telegraph and harbor radio telephone equipment, of course, were provided. In view of the intense work load in the radio room of this type of vessel, careful attention was given to the convenience of arrangement of operating positions, accessibility of all parts of equipment for adjustment or repair, and the lighting and ventilation of the space. Figs 47 and 48 indicate better than words the relative complexity of the reconverted radio room as compared with that first installed in 1932.

The radio direction finder, gyro compass, and fathometer were all of models which had become substantially obsolete through recent technical developments and hence were renewed in their entirety. The radar, a Navy wartime installation, was not renewed, however, as performance was satisfactory and uncertainty as to future developments, both technical and legal, made it questionable as to whether the adoption of a commercial-type instrument was warranted at the time of the reconversion.

The sound motion picture equipment for both first and cabin class were renewed in their entirety, each lounge being provided with a standard theatre-type 35-millimeter duplex installation with automatic changeover machines. The requirements for safety protection with this type of machine, including fusible link and remote manual control of projection port slides, separate ventilation facilities, and extensive insulation of decks and bulkheads, render such an installation on shipboard complex and expensive. However, the non-availability of all types of first-run programs on 16-millimeter safety film precludes the possibility of substituting the latter type of equipment at the present time, although arrangements were made to permit its easy installation at a later date if future developments warrant.

In recent years there has been an increasing amount of electrical equipment which is either completely unavailable for direct-current operation, or available with superior operating features in alternating-current models. This equipment had given rise to the use of numerous fractional horsepower-motor-generator sets scattered throughout the ship. For the most part these sets were small, reliability low, and maintenance high. During the reconversion, which involved installation of considerable additional alternating-current equipment, a majority of the smaller motor-generator sets were eliminated and in lieu thereof two continuous-duty 10-kilovolt-ampere sets were installed in the emergency generator room and an alternating-current distribution system provided throughout the ship. Most non-vital alternating-current loads were transferred to this system.

Cargo, Stores, and Baggage Handling and Stowage

Although the *Lurline* is primarily a passenger carrier, and the amount of cargo handled, tonnage-wise, is small, it should not be assumed that this lessens the necessity for first-rate cargo facilities. On the contrary, the nature of cargo carried warrants careful attention to cargo stowage spaces while the extremely short turnaround time in port makes it mandatory that every possible means be provided for handling cargo simultaneously through as many different channels as possible. High capital and

(Please turn to page 112)

M. S. "Brandanger" —New Interocean Liner Arrives on Pacific Coast

THE new M.S. *Brandanger* arrived on her maiden voyage at Los Angeles, a smart 21 days from London, including her transit through the Panama Canal. She made 17.5 knots on her trial run, with an average of 16.6 knots.

To coincide with arrival of the *Brandanger,* George von Erpecom, chairman of Westfal-Larsen & Co., A/S, is now in California to be present at all ports on the Pacific Coast where the vessel will load on her return voyage to Belgium, Holland and France. The *Brandanger* is commanded by Captain Frode Bjorn-Hansen, who is a veteran in the Pacific Coast-European trade and who supervised the completion of the vessel in Sunderland, England. Captain Bjorn-Hansen previously had command of the Interocean Liner *Moldanger* which was torpedoed during the early part of the war off New York, some of the crew remaining afloat on a raft for 38 days before being rescued. Captain Bjorn-Hansen thereafter commanded other Norwegian vessels during the entire war in the trans-Atlantic transport of war materials.

On this trip from Europe the *Brandanger* carried a large number of the popular small British cars for discharge at Vancouver.

Some of the new features of the *Brandanger* are special compartments for deep frozen cargo in contemplation of increased future demand in Europe for Pacific Coast fresh frozen vegetables, in addition to the regular movement of deciduous and citrus fruits from the Pacific Coast to which the Interocean Line has catered for almost 20 years.

The new *Brandanger* has a total deadweight of 9,275 tons. The propelling machinery consists of a five-cylinder Doxford opposed piston reversible diesel engine of 6,350 horsepower. She is equipped with the most modern nautical devices, such as Sperry Radar, Gyro and

The "Brandanger"

Mr. George von Erpecom, Chairman of Westfal-Larsen & Co. A/S, of Bergen, Norway, who recently arrived here on the "Brandanger" on a tour of the company's offices in the Western Hemisphere. Interocean Steamship Corp. are Westfal-Larsen's agents in San Francisco.

Auto Pilot as well as Loudhailers and Mackay Direction Finder.

There are 16 derricks, the lifting capacity of which are as follows:

4 derricks—10 tons
8 derricks— 5 tons
4 derricks— 3 tons.
Of a total number of 16 winches:
4 are 5-tons winches and the remaining
12 are 3-tons.

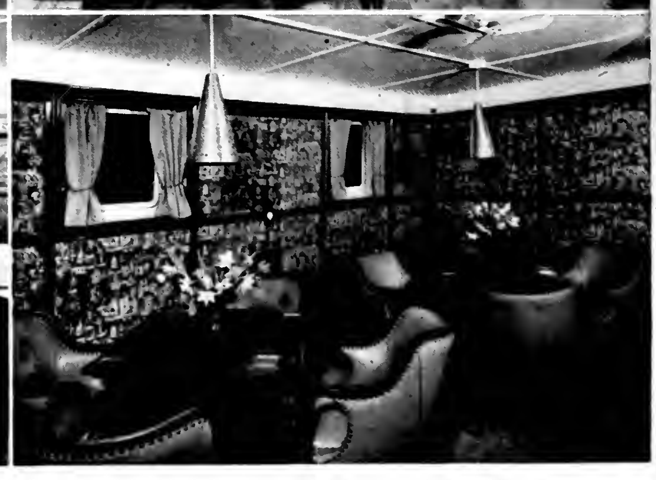
The auxiliaries consist of three 150 KW 220 volt D.C. generators driven by three 6-cyl. Allan diesel engines running at 500 revs/min with a mean indicated pressure of 85 lbs. per sq. in. The bore is 240 mm and stroke 300 mm.

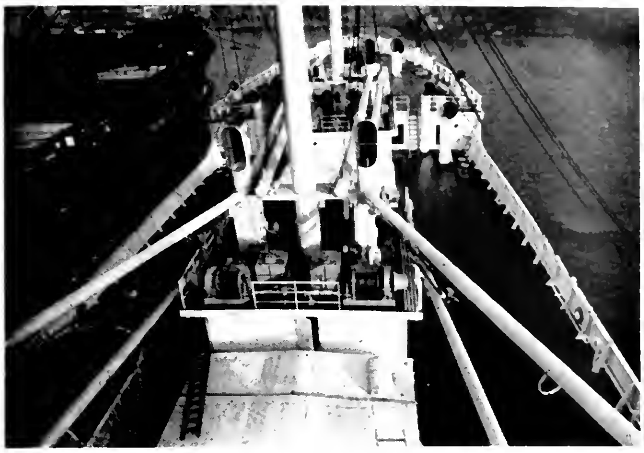
In addition to ventilated cargo space the vessel has 70,000 cubic feet of refrigerator space including a 10,000 cubic foot compartment for deep frozen cargo. The reefer machinery is of the most modern type with temperature controls effected by the means of distance thermometers, allowing a continuous check during the entire voyage. There are four special wing tanks suitable for carriage of vegetable oil or other bulk oils.

As customary on all Interocean Liners, there are excel-

Top: Beds in double berth passenger stateroom.
Bottom: Lounge and smokeroom.

Top: Dining Saloon.
Bottom: Card room.





Fore deck from wing of bridge.

View from poop looking forward.

lent accommodations for 12 passengers, in six single and two double cabins in addition to a deluxe suite. The smoke room, card room, and dining saloon are furnished in modern style and decorated by Norwegian artists. The vessel has forced ventilation throughout all passenger cabins and public rooms. There is a swimming pool, two enclosed verandas and ample space for deck games and promenading.

California Maritime Academy's "Golden Bear" at Valparaiso

In the February issue there appeared a story of the annual training cruise of 110 midshipmen of the California Maritime Academy on the training ship "Golden Bear." The ship departed from San Francisco on February 7, taking the midshipmen to Los Angeles, Magdalena Bay, Callao, Valparaiso, Balboa and Acapulco. The picture below shows the "Golden Bear" at anchor at Valparaiso.

On the Ways

New Construction—Reconditioning—Repairs

Mine Planter "Spurgin" Overhauled

One of only six vessels of its type in the United States, the Army Mine Planter *Spurgin* recently underwent drydocking, painting, and miscellaneous repairs at the Alameda Yard of Bethlehem Steel Company, Shipbuilding Division. Skippered by J. P. Narus, Chief Warrant Officer, the *Spurgin* is operated by the Seacoast Branch of the Artillery School at Fort Winfield Scott.

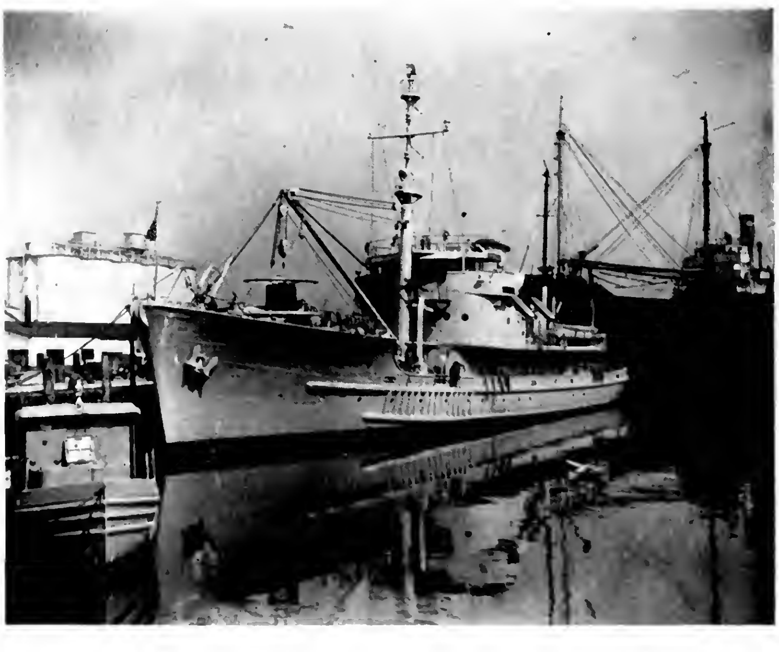
She operates off shore in the San Francisco coastal area for target towing, laying and picking up cable and miscellaneous work in connection with the Coast Artillery's operations.

While at the Alameda Yard the vessel underwent the regular drydocking routine. In addition, new stainless steel weather doors were installed throughout on the boat deck, bridge doors and in the wheelhouse. Her two boilers were completely rebricked, her main and foc'sl deck completely sand blasted and painted and all fixtures in the wheelhouse chrome plated.

The twin screw vessel is powered with a Skinner Uniflow 6 cylinder engine, with three cylinders on each shaft.

Opposite, left to right: John May, Chief Engineer; F. J. Welch, Second Mate; J. P. Narus, Master; R. P. Snow, First Mate, are shown in the wheelhouse of the U. S. Army Mine Planter "Spurgin." Note the shiny new chrome fixtures which had just been installed.

Below: The "Spurgin" shown at Bethlehem's Alameda Yard following completion of drydocking, hull painting and sand blasting.



Busy repair scene photographed recently at Bethlehem's Alameda Yard showing two Army FS boats, right foreground, being readied for layup; a lumber schooner on the yard's 3500-ton floating drydock, with just her stern showing; the Army Mine Planter "Spurgin" which underwent drydocking and miscellaneous repairs.

Busy Alameda Yard

With six vessels of various sizes and types currently undergoing drydocking and miscellaneous repairs, the Alameda Yard of Bethlehem Steel Company, Shipbuilding Division, is busier than it has been for some time, with more than 100 men employed.

In the yard now are two Coast Guard Cutters, Bramble and Gresham; two Army FS vessels being readied for layup; an Army tug and an Army L-boat.

The 253-foot lumber schooner, "Barbara Olson," shown on drydock at the Alameda Yard, where she recently underwent drydocking, cleaning and painting.
The "Barbara Olson" is owned by Oliver J. Olson & Co. of San Francisco which operates her in the lumber trade between Oregon, Washington and California. A familiar sight on the West Coast, the vessel was purchased by her present owners in 1940. She was built in 1918.

The U. S. Army Freight Supply Ship 173 on drydock at the Alameda Yard where she recently underwent drydocking and miscellaneous repairs prior to being returned to layup. This is known as a Freight Supply vessel and was operated by the U. S. Army during World War II carrying passengers and supplies between the various islands in the Pacific. Vessels of this type were extremely useful in these operations because of their shallow draft.

Pacific World Trade
Reg. U. S. Pat. Off.

Global Business Calls For Global Perspective

By ALVIN C. EICHHOLZ
Manager, World Trade Department
San Francisco Chamber of Commerce

SHIPPING and World Trade are activities of global scope. It is necessary that we set our sights accordingly—in space and in time. Only then will we gain proper perspective.

To say merely business has fallen off since the immediate postwar high, is not saying enough. What are the potentialities of the future?

Here are three key figures:

1. Since 1870 the population of the world increased 50 per cent.
2. Trade in manufactured goods since that time increased 300 per cent.
3. World Manufacturing increased 2,100 per cent.

In other words, manufacturing grew much more rapidly than population, so the living standards all over the world could have been raised sky-high. BUT: Trade did not keep up with manufacturing!

Alvin C. Eichholz

Observing World Trade Week again this year (May 22 to 26), those figures perhaps supply the perspective we need as yardstick for the future. We need it before we begin discussing trade restrictions, currency regulations, red tape of all sorts, political disturbances. Of course, all of these difficulities vitally affect world trade. But if every one of them were removed tomorrow, we would still have achieved nothing, if the trade potential of the world were not as fundamentally favorable as these figures show.

With this as a starting point, we may narrow our sights all the way down through I.T.O., trade agreements act, export surplus, etc., to competition with the Gulf, coastwise port cooperation and labor trouble on the Pacific Coast. But it seems important that we keep our perspective, and have the world in mind—even when we talk about local problems.

It is clear enough that it is necessary to get our own house in order first. "Our own house"—that is not just San Francisco, or the Bay Area or even California. It is the Coast. For two years we have been striving to achieve greater unity, greater cooperation, a broader outlook. We have made some progress on widely different levels:

The maritime labor organizations have pledged their help in developing the area's cargo movement;

Two shipping employer groups have merged which, it is hoped, will improve their operations;

The Marine Exchange has established itself on an independent basis so as to enable it to operate as the marine exchange for all Bay ports;

The Foreign Trade Zone was pushed into reality after a long slumber in the drafting stage.

These are encouraging steps, but they are not enough. We are caught in a two-way squeeze of less business and more competition.

The most immediately necessary step would be a San Francisco Bay ports' traffic bureau. We have been talking about this for two years. In the case of the Foreign Trade

Zone we had been talking for ten years. We cannot afford that much time for the traffic bureau. The same is true of the World Trade Center. This project is too well known to need any further comment here.

Beyond all this we need more vigorous efforts in carrying out plans for closer integration in the rate, promotional and technical fields—closer cooperation, that is, between coast ports and communications. Here in San Francisco we will have to do what New York and New Orleans were able to do, before we complain about dollar shortage abroad and Harry Bridges at home.

But our responsibility does not stop at the Coast either. The Reciprocal Trade Agreements Act, clipped by the last Congress, needs our support. The I.T.O. Charter, still not ratified, is gathering dust. Our import policy, too much influenced by special interests which insist on keeping out the bounty of the world, needs an enlightened shot in the arm.

Our potentialities are much better than a local outlook would lead us to believe. Ship entries and departures, and trade volume figures for a limited period don't tell the whole story. Let's look back once more to the population versus goods versus trade ratio quoted above. If we were to consider the United States, or the West Coast, instead of the world as a whole, the ratio would be even more favorable. We have long been dreaming about the "millions of the Orient" facing our coast, and what huge reservoir of customers they could be, if their living standards were higher, and if they had the wherewithall. Well, the dreaming stage is drawing to a close. There are a number of firms right here in San Francisco shipping goods to the tune of hundreds of thousands of dollars to the Orient. Gigantic development programs are under way or planned in India, Iran, the Philippines, Afghanistan, Taiwan, Saudi Arabia, Palestine. American construction firms, engineers and surveyors are swarming all over the Far and Middle East. American manufacturers are delivering the goods and know-how. American shipping can play its part—and the West, because of its geographical location and its superb facilities has the first claim to it.

The developing countries are largely those which have gained their independence recently. The American business man has no longer to deal with colonials, but with free men or their governments. Experience of the construction firms has shown that these governments always have the necessary dollar exchange when vital services for their projects are at stake. Shipping is certainly a vital service.

Shipping and World Trade, as we have said, is a global business. If we wish to conduct it accordingly, we must be willing to give active support to all efforts—regional, national and international—which are aimed at streamlining the procedure of swapping goods, that only practical guarantee for world peace.

National Maritime Day, May 22, and World Trade Week, May 22-28

Typical of the recognition of National Maritime Day and World Trade Week throughout the country is the schedule of events planned for San Francisco by the World Trade Association, Chamber of Commerce, Junior Chamber of Commerce, the Propeller Club, Junior World Trade Association, Ship Scalers' and Painters' Union, State Board of Harbor Commissioners, International Longshoremen Workers' Union, Export Managers Club, World Affairs Council of Northern California, Bay Area Aviation Committee, Marine Exchange, Pacific-American Steamship Association, Sailors' Union of the Pacific and Marine Firemen's Union.

The scheduled program follows:

Friday, May 20

12 noon—Maritime Day Luncheon, Commercial Club. Commissioner David J. Coddaire, United States Maritime Commission, Speaker. Open to the public.

6 p.m.—Mariners Club of California banquet, Palace Hotel.

8 p.m.—Dance for Merchant Seamen, Embarcadero YMCA.

9:30 p.m.—*World Affairs Are Your Affairs*, radio program, KNBC. Maritime theme featuring David J. Coddaire.

Saturday, May 21

1 p.m.—Official Opening of World Trade and Maritime Exposition, second floor, Ferry Building. Open to the public without charge, 10 a.m. to 10 p.m., May 21-26.

2 p.m.—National Maritime Day Parade from Exposition at Ferry Building to Civic Center.

9 p.m.—World Trade Week Dance, Sir Francis Drake Hotel. Sponsored by Junior World Trade Association of the San Francisco Chamber of Commerce. Consular Corps as guests. Open to the public.

All Day—Public inspection of Army transport vessel, Navy ship and the California Maritime Academy training ship, *Golden Bear,* near the Exposition at the Ferry Building.

Sunday, May 22, NATIONAL MARITIME DAY

Monday, May 23, IMPORT DAY

Tuesday, May 24, INTERNATIONAL TRADE AND LABOR DAY

Wednesday, May 25, INTERNATIONAL ADVERTISING AND AVIATION DAY

Thursday, May 26, WORLD NEIGHBOR DAY

Friday, May 27

9:30 p.m.—*World Affairs Are Your Affairs,* KNBC Radio Program. Theme: "Importance of World Trade".

Chairman of the Maritime Day celebration is D. N. Lillevand of Grace Line, and of World Trade Week, M. J. McCarthy of Berry & McCarthy.

An extensive exhibit of world trade and maritime products will be held in the Ferry Building. Both import and export commodities will be shown in order that the public may have a greater understanding of the importance of world trade. In addition to the exhibits, there will be special entertainment, radio shows and folk dancing.

Current World Trade Data

The following current information concerning trade with foreign countries is quoted from the Foreign Trade Bulletin of the American National Bank of Chicago through the courtesy of A. M. Strong, vice president. Complete details regarding any matter mentioned can be obtained from their Foreign Department. While the data has been compiled from sources which they consider reliable, it is disseminated without responsibility on their part.

Belgium

The Federal Reserve Bank of New York, which had temporarily ceased certification of a rate for the Belgian franc on March 15, started on March 22 to certify two rates, one for the bank note and one for drafts. The double certification, however, does not imply in any way recognition of an official dual par value. The Belgian measure is experimental and will be given a trial period of two months or more. By that time the discount on bank notes may have been reduced to a figure close to handling costs, or the previous restrictions on bank note imports may be restored.

Bolivia

The U. S. Embassy at La Paz states that for the first time in approximately two years the issuance of foreign exchange to meet commitments for items of prime necessity was current; the issuance of exchange for semi-luxury items has been on a current basis for more than a year.

Brazil

Brazilian banks are no longer required to deliver 75 per cent of their exchange purchases to the Banco do Brazil. Exchange may now be retained by the banks and may be used to liquidate transactions authorized by the Bank Fiscalization Department. Exchange unutilized within 48 hours must be delivered to Banco do Brazil, who in turn, will make the exchange available to the Brazilian banks. All exchange applications will be centralized with the Fiscalization Department in Rio de Janeiro, who will authorize applications chronologically by groups as detailed below and in accordance with percentages to be established for the allocation of available exchange.

1 *Preferential*—Products exempt from the delay period of 45 days such as, agricultural machinery, fuels, lubricants, aluminum, lead, zinc and other scarce metals, as well as some pharmaceutical products not manufactured in Brazil.

2 *First Category*—Merchandise exempt from previous licenses and in cases where the license has been placed in Category A.

3 *Second Category*—Transfers of capital, profits, interest, dividends, etc.

4 *Third Category*—Transfers of transport and communication companies, cultural, scientific and other materials destined for educational purposes.

5 *Fourth Category*—Importations carrying previous license under Categories B and C.

Canada

Canadian import restrictions have been liberalized and the following items completely remove from import controls and the prohibited list.

Paints; Glass and silvered glass mirrors; Lacquer gummed paper; Varnish; Lumber; Veneers and plywood; Glass articles to be mounted or cut; Glass decanters; Machine-made tumblers; Hat bands and hat braids for use by manufacturers.

Import Schedule No. II has been revised effective April 1, 1949 and it is expected that the percentage of authorized imports will be further increased.

Germany

The latest available detailed information on the procedure for applying for permission to visit Germany on business, is contained in a revised circular prepared by the Office of International Trade. The circular will be supplied gratis by the Office of International Trade upon request.

India

The Commerce Ministry in India, in a communique of February 26, announced further restrictions on imports from dollar and hard currency countries during the first half of 1949. Imports of second-hand clothing, condensed and powdered milk, saccharine, leather, cloth, brake fluid, synthetic resins, fan belts, radiator hoses, rubber horn bulbs, and household electric appliances will be prohibited. No licenses will be issued for kerosene, motor spirit, and most of the mineral oils, including diesel oil; licenses for several other commodities will be issued on a reduced scale.

Explaining the change in policy, the Commerce Ministry stated that in recent months exports to the dollar and hard currency countries have fallen, leading to a reduction in the already short supplies of hard currencies. By the new measure, India hopes to conserve these resources for more important requirements (e.g., food, capital goods, and essential industrial goods). No material changes are being made as regards imports from soft currency areas, including Sweden.

Indonesia

Following suspension of E.C.A. funds for procurement of supplies for Indonesia, the Government, pending a review of the over-all import plan, temporarily suspended purchases from the United States because of the critical dollar position.

Peru

Peruvian consuls are prohibited from certifying consular and commercial invoices covering goods which are not allowed to enter Peru. Prohibited goods arriving in Peru which were shipped before February 23, may be cleared subject to special authorization and a surcharge of 10 soles per dollar on the value of the merchandise. All prohibited goods shipped after February 23 will be confiscated.

Republic of The Philippines

By a recent Executive Order, Philippine importers are allowed to transfer quotas from one controlled article to another with the specific approval of the Philippine Import Control Board in each case. The order, which amends Section 4 of Executive Order 193 implementing import control, enables importers of several controlled commodities to make maximum use of their quotas in terms of value. It also improves the position of importers with small quotas and benefits those who placed orders in excess of quotas before January 1, 1949.

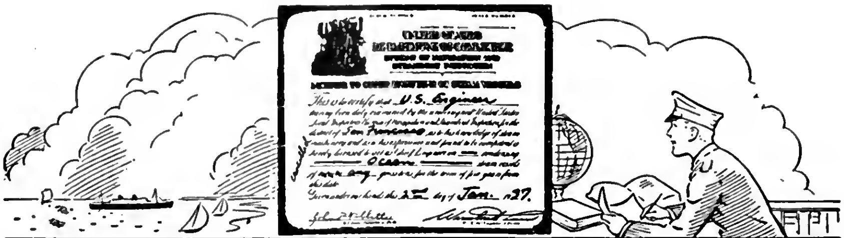
The Philippine Import Control Board announced on March 8, 1949 that in order to ensure full compliance with import-quota restrictions it would assume control of the release of controlled merchandise entering the country.

Export Credit Data

Collections Paid, Collections Outstanding, and Confirmed Letters Credit Outstanding February 28, 1949 as reported to Federal Reserve Bank of New York by 12 New York City Banks:

Collections paid during February; Outstanding February 28, 1949
per cent of total number of items in thousands of dollars

Country	Schedule of Prompt Payments	Prompt	Up to 30 days slow	31 to 60 days slow	61 to 90 days slow	Over 90 days slow	Collections	Letters of Credit Confirmed
Argentina	2 mos.	20.8	16.7	16.7	8.3	37.5	15,825	46,983
Bolivia	2 mos.	61.2	19.6	5.6	2.8	10.8	1,297	5,104
Brazil	6 wks.	7.3	9.4	13.2	12.7	57.4	71,129	18,138
Chile	2 mos.	69.7	10.4	6.3	3.4	10.2	3,907	11,923
Colombia	7 wks.	33.4	22.2	14.9	4.4	25.1	6,603	15,490
Costa Rica	2 mos.	30.0	8.6	7.1	—	54.3	1,627	901
Cuba	3 wks.	76.3	14.2	5.0	1.8	2.7	3,898	8,072
Dom. Rep.	1 mo.	65.9	20.8	8.2	1.3	3.8	507	2,205
Ecuador	6 wks.	59.8	23.8	8.3	2.9	5.2	1,632	1,742
El Salvador	1 mo.	62.4	19.7	4.9	3.9	9.1	709	848
Guatemala	6 wks.	69.4	15.7	8.3	2.8	3.8	520	743
Haiti	1 mo.	87.4	6.6	4.1	1.1	0.8	356	368
Honduras	1 mo.	67.2	22.3	5.0	1.9	3.6	742	392
Mexico	1 mo.	74.4	14.6	5.7	2.1	3.2	2,620	28,945
Nicaragua	6 wks.	68.3	21.8	5.9	0.5	3.5	541	47
Panama	1 mo.	88.6	6.9	2.4	0.6	1.5	799	1,869
Paraguay	2½ mos.	50.0	25.0	10.3	7.4	7.3	270	1,079
Peru	2 mos.	62.9	4.1	2.3	3.1	27.6	3,847	2,965
Uruguay	2 mos.	67.8	13.8	12.1	1.7	4.6	996	5,720
Venezuela	6 wks.	58.5	22.3	10.0	3.6	5.6	9,885	15,419
Br. Guiana	6 wks.	100.0	—	—	—	—	44	—
Du. Guiana	5 wks.	69.7	19.7	3.0	—	7.6	137	485
Fr. Guiana	5 wks.	—	—	—	—	—	—	—
Total		59.8	16.7	8.1	3.6	11.8	127,891	169,438

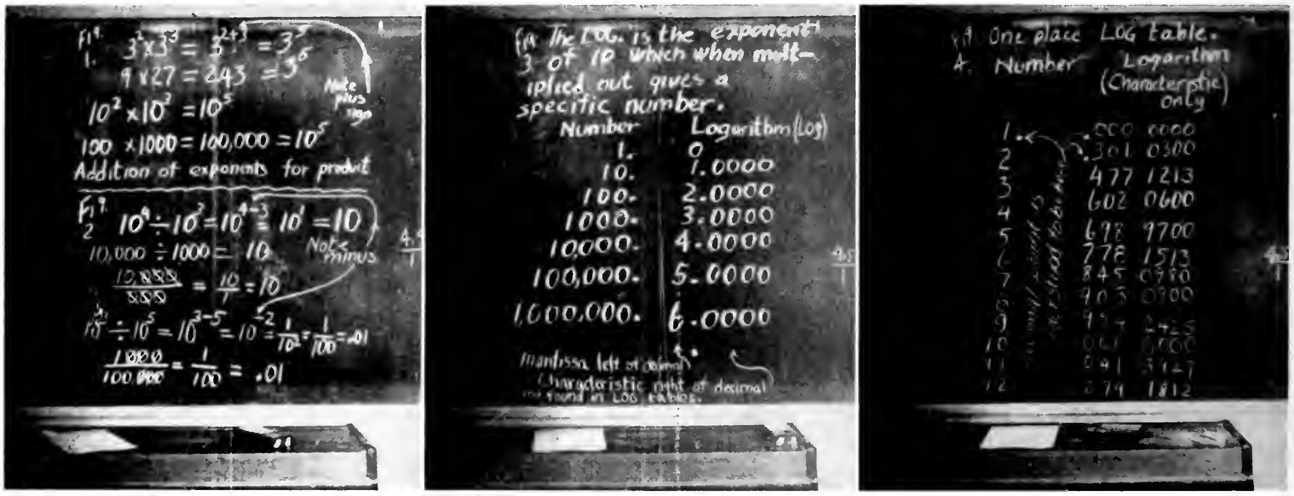


Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

Chalk Talk on Logarithms



Figures 1 to 4 mentioned in the text.

YOUNG George Cambell, the ambitious and imaginative Junior Engineer of the Army Transport *General R. M. Square* was in the officers' day room with books and papers scattered on the table in front of him. The loud speaker of the inter-com system on the for'd bulkhead had just sounded the strokes of the ship's bell. "Two bells," he muttered to himself. "Eleven hundred and I still don't understand this logarithm business."

The door opened and Ole Swanson, the friendly reliable Second Mate stepped in to pour himself a cup of black coffee. He had just come off watch, an hour late, and was a little excited because his star sights had placed the ship a hundred miles off course by dead reckoning and he had to find the error before the Captain checked the ship's rough log at the regular 1130 time. Ole never was grumpy or surly, only excited. Under such conditions his English relaxed into a strong Swedish dialect. "What you tink you doing now? I never see you engineers working. Always you are in the sack or in here soaking up coffee. I tink dose engines run alright witout no engineers."

George understood Ole and was not bothered by his negative humor. "Ole, do you mates use logarithms in your work?"

"Oh sure ve do. Ve haf log-tangents, log-cosecants, log-dis, log-dat." Ole's eyes twinkled a little as he saw the log table opened up before George. "You got no use for dat stuff. You would never understand it anyway. It's only for Captains and Mates. Do I bother you about steam pressure and feed water? But you wouldn't know about that either."

George was hopeful. "It says here that logarithms are exponents of 10." He had a copy of the *Pacific Marine Review* opened up to a picture of an engineers license and a young engineer diligently studying for his examination. He could see that Ole was not the one to help him with that subject. He realized now that there was a difference between using something and teaching someone else to use it. Also, that much knowledge was in use in a routine manner without any understanding

of the theory back of the knowledge. His mind flashed to a skillful truck driver who could not commence to design or make a truck. He thought of his ship and her engines and machinery and how he was still only learning to use this equipment and knew little of its theory. Almost in despair he turned to glance at the ship's clock on the for'd bulkhead. His mixed surprise and pleasure showed in his face. There, standing and listening was Staff Chief Frank Farran who had always somehow pulled him out of these fogs of ignorance. "Mr. Farran", George exclaimed, "Gosh, sir, I know you can explain these logarithms to me."

Without saying a word, Frank, pencil already in hand started writing down figures on the paper. "Look" he said, "To multiply and divide numbers of two places like 34 and 26 we do it longhand and think nothing of it. Even with three and four place numbers we do it longhand, but accurate measurements like the mates do must have six or eight figures in them to be accurate enough to locate our ship on the earth because of its size. To locate to one mile on a 25,000 mile circumference our figures need five places because that number is needed to express the miles circumference. Now Ole here can locate the ship as close as 50 miles, that's a circle of 100 miles. So he needs two less or three figures and can navigate in longhand. He then guesses where he is within the 100 mile circle, except when the Captain is watching him; then he uses his log tables."

Ole caught the jibe good naturedly. "I tink I navigate O. K. You black gang yust keep her tail twisting; I do the rest."

Frank continued. "Multiplying and dividing numbers longhand with four and more figures in them is a lot of work with much possibility of error. With logarithms the same work can be done by the simple addition or subtraction of numbers with the same degree of accuracy as in longhand if we are within the range of the log tables we are using. Some tables are good to only four places and the accuracy is thus limited to the first four figures in the answers we get. Seven place tables are available and by much use we can learn to interpolate between places in the table and have an accuracy of eight places. However, a seven place log table is a thin book, and not merely a half dozen pages." George listened intently while Ole stood behind sipping his coffee.

"Now look" (Fig. 1) "Three squared times three cubed is three to the two plus three. Note this is not two times three but two plus three even though we multiply. Work it out for yourself. Nine times 27 is 243, is also three to the fifth. Rule—to multiply two or more powers of a number we *Add* the exponents. Also, (Fig. 2)—to divide two powers of a number we *Subtract* the exponents." Frank figured on rapidly. "Even if the subtraction is a large number from a small we have a negative exponent left and that has a meaning. In that case it means the reciprocal or 1 divided by the answer. But we usually convert to decimals."

"Yes, Frank, but where do we get these numbers and handy exponents?" George's question was serious.

"We make 'em and use 'em. But fortunately for you and Ole, some old long bearded gents several hundred years ago who went by the title of Philosophers figured them out and wrote them down in tabulations which we now call the log tables. Vega published his *THESAURUS LOGARITHMORUM* in London in 1792. I have a copy of Bruhns' seven place table published in Leipzig, August, 1869. The logarithm of all the numbers from 1 to 100,-000 is given on 186 pages of small type. It is probably the most interesting (exponent—^{1}) reading I know of. Notice how negative exponents can reverse the meaning of an adjective even. Interesting—^{1} means dull."

"The number selected is 10 as it has many advantages as the base of a logarithm table. Other numbers have been selected and tabulated having some special advantages. We will consider logarithms with the base 10 only. The log table then will be a list of all the possible exponents of the number 10, fractional and whole numbers and all, expressed as decimals. Here is a simple table of the 'whole number' logs." (Fig. 3.)

George gasped, "Yes, but how about the thousands of numbers in between these you have listed?"

"Well, I do not remember all those figures but let me get my memorandum book. I'll be right back."

"Frank, he's plenty smart feller, I tink."

"Yes, Ole, he has a degree from some college."

Frank returned and, "Now, here (Fig. 4.) This is a one place table, and thus of the numbers from 1 to 10. A two place table would have a hundred numbers, a three place a thousand and so on. Now, George, let's see you use it to multiply 2 times 3."

Ole laughed but straightened quickly at a frown from Frank. This was serious business.

George studied a moment. Then—"The exponent of 10, which multiplied out makes 2, is opposite 2 in the table and is 3010300 and for 3 it is 4771213. Adding these I get 7781513 and this should be the exponent of 10 which multiplied out is the answer of 2 times 3. But I do not know how to multiply out an answer which is 10 with this seven place exponent. . . . Oh, I get it, of course it's in the table again but only backwards. I see. I look for the number 7781513 under log, and find the corresponding number. Here it is exactly, and the answer 6. Why, that's easy." He looked up at Ole for confirmation but got a sour look.

"Dat ain't de way I heared it," Ole said. "It ain't in Bowdith thet way."

Frank's glance of approval reassured him and he again turned to his simple one place table. "Now, let's try, say, 9x5. Log of 9 is 9542425 and of 5 is 6989700. Adding we have 1.6532125. But this log is not in the table."

Frank helped out. "The exponent of 10 is now more than 1 and less than 2; the answer is thus between 10 and 100. This takes care of the 1. You need a 2 or 3 place table now, but let's guess and see how close we can come. The 653 lies about half way between 602 for 4 and 698 for 5. The answer is thus half way between 40 and 50 or say 45.

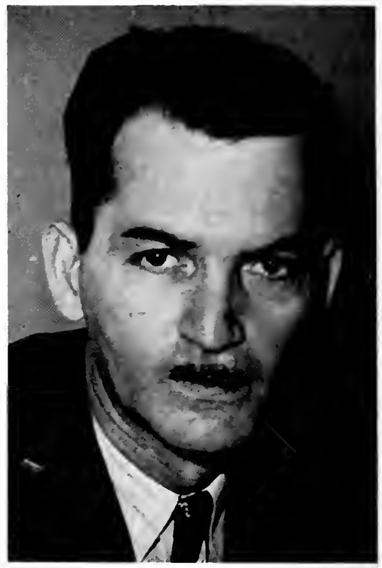
"I tink I better go now. De Captain he never let me guess where the ship is. You guess the engines, I figure the navigation." Ole headed for his stateroom.

"You study this one-place table for a while and then I can tell you some more about how they use these figures and how they calculate logs. Maybe we can make a slide

(Please turn to page 120)

Port Engineers

Joe Dennis



Harry Martin

Joe Dennis
Of Craig Shipbuilding Co.

A shy southern boy (native of Georgia), Joe graduated from New York State Merchant Marine Academy and joined Moore-McCormack Lines as a cadet. He held various assistant engineer jobs and went on up the ladder to chief. In 1942 he went ashore as Assistant Port Engineer, working with Harry Martin in San Francisco until 1947. He then took on his present position as Sales Engineer with Craig Shipbuilding Company in Long Beach.

Los Angeles Port Engineers

The April meeting of the Los Angeles Society of Port Engineers was addressed by Ray Sullivan, of the Hagan Corporation. His address, on Automatic Combustion Control, follows.

Ray Sullivan
of Hagan Corp.

Port Engineer of the Month
Harry Martin of Moore-McCormack

One is just about as apt to meet Harry Martin in Los Angeles, Portland, Seattle, or Vancouver as he is to find him in his office at Pier 9 in San Francisco, for Harry is Moore-McCormack's Port Engineer for the whole Pacific Coast.

Harry joined Moore-Mac on the East Coast, where he spent most of his seagoing time. He signed on in 1930 as an unlicensed member of the engine room crew, and by 1936 was sailing as Chief Engineer.

Harry was brought ashore for his present assignment in 1941, in which he has served steadily since that time. He lives (when home) in the Sunset District, and like many another traveling man, his principal hobby is his family: wife, girl 5½, and boy 3.

Automatic Combustion Control

THIS term "automatic combustion control" is familiar to all marine engineers now. But the actual function and maintenance is still a mystery to some engineers and they probably think of it as some Rube Goldberg dream. Possibly a bit of historical background and some functional points will illustrate the benefits to be derived from automatic combustion control.

In the stationary power plant field combustion control has been used for over 25 years. Right after the first World War the Hagan Corporation pioneered in developing air operated combustion control and some of these units are still in operation. Although developed at the same time as high pressure boilers, the economy and safety of automatic control is applied to industrial boilers

regardless of pressure.

In the marine field the use of automatic combustion control only dates back to 1936 when the S.S. *Resor* and S.S. *McCobb* were built at Federal for Standard Oil. (They were equipped with Hagan metering control). It is practically a must that control be used on the high pressure, low water storage modern boilers. Since superheat is so critical in modern turbines, the excess air must be controlled carefully and constantly. Automatic combustion control can do no more than the best fireman but it can make the changes necessary, instantly and constantly, even starting the change before the need is noticed on a standard steam gauge. More than 1200 of the war built ships were equipped with automatic combustion control under the Maritime Commission program. The value of this was seen as inexperienced firemen could hold steam, because their main job was cutting in and out of burners. Since the war many Victory and Liberty ships have been fitted with automatic control with considerable saving in fuel which pays for the equipment in a few months at the present high fuel costs.

Motive Power

The power source for controls is either pneumatic, hydraulic or electric. Due to the fire hazard of oils and the fact that a leak will change characteristics the hydraulic is not used on marine installations and is limited in stationary practice.

The pneumatic has found far greater acceptance in the marine field than the electric. This is due to simplicity of operation, maintenance and construction and the safety factor of energy storage in the compressed air tank in event of electrical power failure.

The function of any control is to maintain a constant steam pressure at the throttle regardless of the steam load. This entails the coordinated adjustment of fuel and air to maintain a constant minimum excess air and consequent good combustion regardless of changing steam demand.

But first, let us realize that there is no true fully automatic combustion control in the Merchant Marine use as yet. A control system cannot compensate for shortcomings in the equipment being controlled. The present burner does not have the range to take the plant from port condition to full sea load without changing tips or cutting burners in and out. Also due to design characteristics, fans and dampers cannot take us through the full load range without speed change by use of the rheostat. So, since the control equipment has been added after all other equipment in the fire room has been installed without thought of the controllability of this equipment let us take what we have and make it work to the best of its economy.

Control Methods

Since we have two variables, oil and air, to control, we also have two methods in common use to control these variables. These are the Series Control and the Parallel Series Control. In the series control the steam pressure controls one variable and the second is controlled by being proportioned by a ratio regulator. The parallel series control is where the pressure positions, both variables and then one variable is corrected by a ration regulator.

In my personal opinion the advantage lies in the Series Control system using air flow as the primary controlled variable. Let us run through a control setup just this way. We have five pieces of equipment for a single

(Please turn to page 116)

There is Engineering Power in This Picture

The picture below was snapped at the April meeting of the San Francisco Port Engineers Society. Facing camera at rear is Carrol Reeves of DeLaval. Next is Ray Sample of Matson; Ed Graff of Grace; the *Marshall; President Bob Streiff; Ernest M. Thearle; Jack Crose of Gisholt (the speaker, on Dynamic Balancing). Lower left: H. V. Barbieri of Coast Guard and ex-president Frank Smith.

*** Program Chairman Marshall Thomas Joseph Garlinger of Army Transport.**

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Lloyd L. Kennedy (H)	U. S. Coast Guard (BMIN)	2009 Averill St., San Pedro
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Carl Reed (M)	Richfield Oil Company	1400 W. 7th St., Long Beach
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Harry J. Summers (H)		1217 So. Leland St., San Pedro
J. L. Wosser (M)	Matson Steamship Company	626 Prospect St., Honolulu, T.H.

M—Member
AM—Associate Member
H—Honorary Member

Thearles and Thearles

Their future is the engineering world's gain.

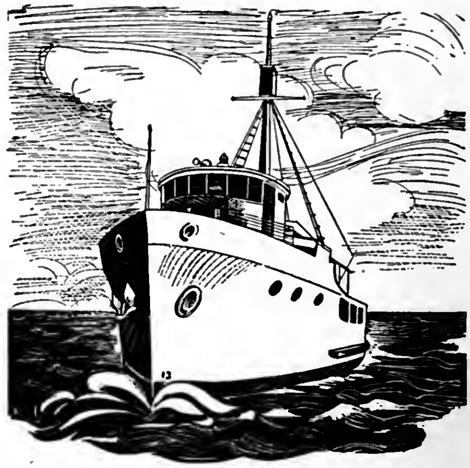
Below, left: Ernest M. Thearle, retired, of General Electric Co.

Right: Phil H. Thearle, Superintending Engineer, San Francisco Port of Embarkation, and ex-president of Port Engineers Society.

The boys at the left are the same engineers, a little earlier.

Their past is their family's delight.

Coast Commercial Craft



Radar Installed on Fishing Patrol Boat

Radar, first developed to save men and cargoes, is out on the high seas of the Pacific to save fish—plus a sizeable hunk of California's riches that come from commercial and sports fishing. Intent on conservation of marine life from sardines to sharks, the California Fish and Game Commission's newest patrol boat, the 83-foot *Albacore,* has been equipped with General Electric's "packaged unit" radar set and is now patrolling the waters of northern California from Morro Bay to the Oregon line, some 700 miles.

With the fishing industry down to fifth place among the state's leading industries, commercial fishermen, packers, dealers and sportsmen all are concerned over the need for stricter enforcement of the existing fishing regulations and the need for new ones.

The *Albacore* with its radar can spot boats within the three-mile limit where in the past they would have gone unnoticed in darkness or fog.

The viewing console of G-E's electronic navigator is calibrated, and dead reckoning can be taken by the skipper of the *Albacore.* The little "blob" of light on the radar screen will help in determining the size of the boats because fishing vessels reflect much smaller than a coastwise tanker or ocean-going vessel, and usually fishing boats stay fairly close together.

Captain Ralph W. Dale, skipper of the patrol boat, said that all members of his crew operate the simplified G-E navigator except the cook—and he is too busy.

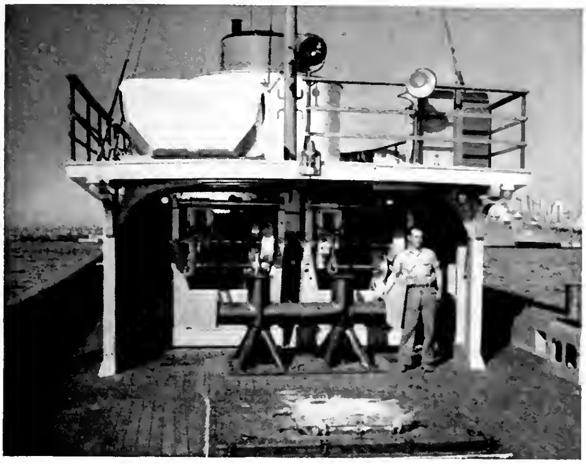
The *Albacore* will patrol at all times and sometimes will be out for several weeks at a time. Without the electronic navigator, patrolling would be held up for a month or more at a time during bad weather, and when the boats did go out only a narrow swath of the open waters could be watched.

The Bureau of Patrol feels that the very presence of the patrol boat equipped with radar will deter violators whereas during the war, shore wardens could do little except merely watch illegal use of drag nets within the three-mile limit.

The "Albacore" in San Francisco Bay.

The Tug "Challenger"

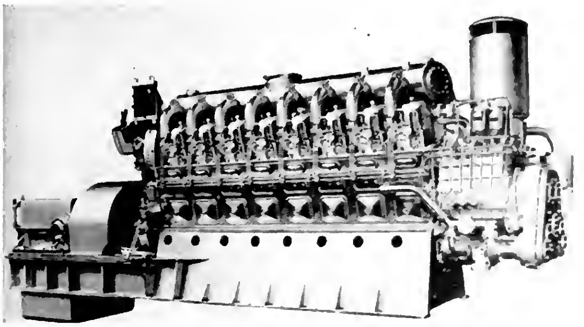
One of the largest and most powerful tugs built on the West Coast since the end of the war, the M V *Challenger* was built by San Diego Marine Construction for the Star & Crescent Boat Company of San Diego. The tug recently completed her first towing job, going



Tug "Challenger." Looking forard on the after-deck at the towing equipment. Towing winches were built by San Diego Marine Construction Co.

to Magdalena Bay and bringing back the 1500 ton tanker *Seekonk*. She made the round trip in five days, and is said to be capable of performing any job assigned to her anywhere, no matter how long the haul.

The *Challenger* is 104′ overall, 24′ beam and 15′ molded depth. Her engine was manufactured by the



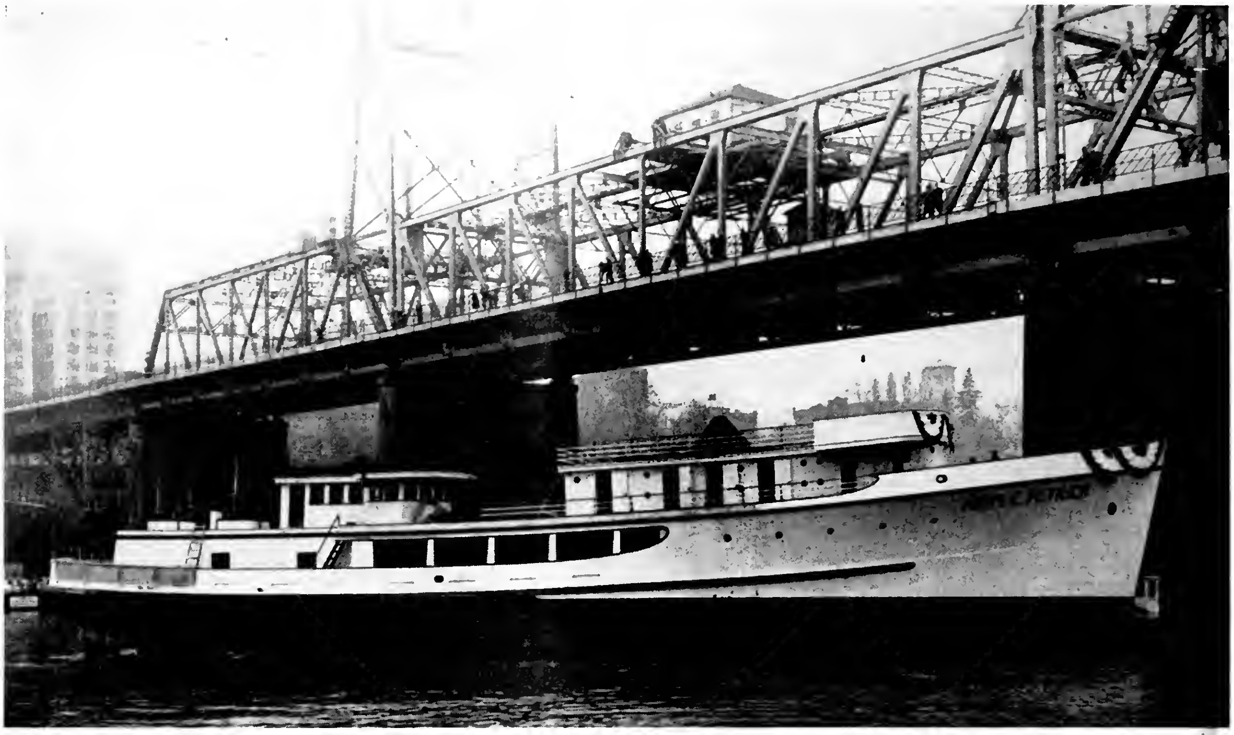
Model 278A General Motors Diesel engine. This 16 cylinder, 1600 horsepower engine, is the type installed in the "Challenger."

Cleveland Diesel Engine Division of General Motors Corporation. It is their model 16-278A, 8¾″ bore by 10½″ stroke, developing 1600 shaft h.p. at 750 r.p.m., driving through a Falk airflex clutch and reduction gear of 2½:1 ratio. The tug is equipped with electric controls and can be operated from the pilot house, the after deck or the engine room proper. She will make 13 knots and has a long cruising radius as its fuel oil capacity is 35,000 gallons, with lubricating oil and fresh water capacity to correspond.

Capt. Oakley J. Hall is owner of the shipyard where the tug was built, as well as of the Star & Crescent Boat Company.

Oakley J. Hall, General Manager, Star & Crescent Boat Co., San Diego.

Hull view under way.



Largest Tuna Clipper Launched

Described as the largest tuna clipper ever built, the *Mary E. Petrich* was launched in March at the Western Boat Building Company, Tacoma. A full description of the boat will be published after the completion of trials. The pictures here show the indoor launching, the vessel waterborne, and a profile view clear of the launching ways.

James F. Petrich of the Western Boat Building Company spoke before the March 31 meeting of the Society of Naval Architects and Marine Engineers at San Francisco on the general subject of the tuna clipper. His paper will be found in a future issue.

Pacific Marine Review News Flashes

DOLLAR APPEALS DECISION ON APL

R. Stanley Dollar and his associates have resumed their efforts to regain control of American President Lines by appealing from a decision against them handed down last December by the United States District Court of the District of Columbia.

* * * * *

PASSENGERS ON MATSON FREIGHTERS!

Matson Navigation Co. has inaugurated what promises to be a notable service. The 15 freighters offer weekly passenger service (12 passengers each) each way from San Francisco/Los Angeles to the Islands, and every other week from the Pacific Northwest. Inter-island service is also provided. More detailed announcement next issue.

* * * * *

NEW COMPANY ENTERING SHIP REPAIR FIELD

War Assets Administration announces the 10-million-dollar former Moore Drydock Co.'s west yard in Oakland has been sold to the newly-formed Oakland Dock and Warehouse Co. for $1,201,500 and that it will be reactivated soon as a repair and outfitting yard.

* * * * *

ARMY TRANSPORT SERVICE MAY CONVERT TWO MORE SHIPS

The P-2 transports GENERAL W. M. WEIGEL and GENERAL JOHN POPE are awaiting orders from Washington regarding their possible "safety at sea" conversion. They are at San Francisco Port of Embarkation.

* * * * *

PROTOTYPE PLANS DUE

The Maritime Commission expects the plans for the first of the two "prototype" vessels to be ready for distribution to the industry this month.

* * * * *

GENERAL FLEMING IS M. C. CHAIRMAN

Maj. Gen. Philip B. Fleming's nomination was announced Thursday to replace V.-Adm. W. W. Smith as chairman of the agency which supervises the Nation's merchant marine.

CHAMBERLIN AWARDS CONVERSIONS

Commercial Ship Repair has been awarded two conversion contracts totaling $180,870 by W. R. Chamberlin & Co., of San Francisco. The work will be done in the San Francisco plant of Commercial Ship Repair.

The two ships are of the LSM type and will be converted into coastwise lumber carriers at a cost of $90,435 each.

* * * * *

SHIPPING LINES GIVEN BUILDING FUND EXTENSION

Approximately 15 steamship lines have received two additional years in which to commit some $23 million in replacement funds.

As of Feb. 28, the latest date for which figures are available, there was a total of $23,304,530 in the section 11 funds, including:

American Hawaiian Steamship Co., $6,866,529; Mount Steamship Corp. (a subsidiary), $2,070,128. Total in American Hawaiian group, $8,936,656.

Luckenbach Steamship Co., $970,332; Pope & Talbot, Inc., $453,609; Standard Fruit & Steamship Co., $75,000; Standard Navigation Corp., $155,500; The Texas Co., $4,055,805; Waterman Steamship Corp., $397,480; Weyerhaeuser Steamship Co., $360,891.

* * * * *

KEELS LAID

The keel of the second of the three passenger-cargo liners for the American President Lines, to be named the PRESIDENT ADAMS, was laid April 27, 1949, by the New York Shipbuilding Corporation at Camden, New Jersey.

The keel for the PRESIDENT JACKSON, first of the trio of Round-the-World liners, was laid March 28, and it is anticipated that the third will be laid down in May.

The completion of the three vessels is scheduled for 1950.

* * * * *

LAY-UP FLEET TO BE REPAIRED

As previously reported here, the vessels in the lay-up fleets that are less than 50% damaged are to be repaired in private yards. The total number is 268, of which 134 have been selected, mostly on the West Coast. An appropriation of $25,000,000 is awaited from Congress.

* * * * *

PLAN FOR WEST COAST SHIPBUILDING

A plan sponsored by Congressman Allen of California and now before Congress would distribute shipbuilding around the country in the ratio of Atlantic 6, Gulf 1, and Pacific 3. Whenever shipyard employment would fall below 60,000 on the East Coast, 10,000 on the Gulf Coast, and 30,000 on the Pacific Coast, the statutory differential between East and West would be disregarded. See editorial in this issue for prospects.

Running Lights

Thomas C. Ingersoll

Tom Ingersoll Heads Bethlehem Pacific Coast Shipbuilding

The appointment of Thomas C. Ingersoll as General Manager of the Pacific Coast District of the Bethlehem Shipbuilding Division is announced by D. D. Strohmeier, vice president. This Division is comprised of the San Francisco, Alameda and San Pedro yards, now engaged in ship repair activities. Ingersoll will continue as Manager of the San Francisco Yard, a position which he has held since 1944. In that year, he also became Manager of the Bethlehem-operated Maritime Commission Yard in Alameda, known as Bethlehem-Alameda Shipyard, Inc. This yard built eight P2 type transport ships for the Navy during the war, and, more recently, the two trans-Pacific luxury liners, *President Cleveland* and *President Wilson*, for the American President Lines.

Ingersoll attended Cornell University and graduated in Naval Architecture and Marine Engineering. After graduation, he started as a shipfitter's helper in the Manitowoc Shipbuilding Corporation in Manitowoc, Wisconsin. In 1932, he came to the West Coast and worked in various capacities in the marine field until May 1936, when he joined Bethlehem as a draftsman.

Ingersoll succeeds W. M. Laughton who is retiring from active duty as General Manager of the Pacific Coast District, but will continue with the Company in a consulting capacity.

ommercial Ship Repair olds Open House To Celebrate ew San Francisco Location

ured on this page are part of the crowd which turned out rch 25th to celebrate the opening of Commercial Ship's new Francisco facilities.

POSITE, TOP TO BOTTOM:

Streiff, Pacific Tankers; William Manuel, U. S. Maritime Com-ion; Jack Archbold, American Bureau of Shipping; Fred hbold; Ed Nystrom.

. Ira Chapman; Ira Chapman, American President Lines; lter Kirklin; George Thompson, Shepard S. S. Co.; Harry tin, Moore McCormack Lines.

x Johnson, George Jackson, Miss Barbara Watson, Louis pman, Mrs. Deppman, E. A. (Eddie) Black.

of the crowd enjoying the buffet spread.

ther enthusiastic group pose for the photographer.

OW, TOP TO BOTTOM:

n Scurfield, Mrs. Hal Camman, Mary Mosley, Mrs. Louis pman, Mrs. J. G. Kelly, Hal Camman.

eption Committee:

Fowler, Bud Featherstone, Ed Tichy, Vince Foell.

Harris: Jack Archbold; Fred Archbold; Wynn Sturgess, rson Navigation Co.; Dick Street, American Hawaiian; John es, States Marine; Bill Brennan, States Marine.

e Torsche, U. S. Maritime Commission; Harry Martin, Moore Cormack; Alex Johnson; George Jackson.

Pacific Far East's "Flying Scud" Gets Radar in 24 Hours

Twenty-four hours from the time work started, the *Flying Scud* had her new General Electric "Electronic Navigator" in operation. This record installation was made by the California distributor of General Electric radar, Ets-Hokin & Galvan.

Due to short in-port time, the mast, doubler plate, braces, etc., were fabricated ahead of time. A derrick barge was standing by as the ship tied up, and work started simultaneously on the mast, antenna, radar console, motor generator, and the wiring, which was to be concealed behind the sound-proofing insulation.

One of Ets-Hokin & Galvan's radar technicians then accompanied the ship to Seattle to acquaint the skipper and the mate with operating techniques. The G-E radar proved its value even on its first voyage, as the weather was foggy nearly all the way to Seattle.

Other recent G.E. radar installations by Ets-Hokin & Galvan include three other Pacific Far East vessels, the *China Bear, Pacific Bear* and *Contest.* The latter is a C-2, and is of especial interest because of its being a chartered vessel. When a charterer installs radar on a vessel, radar is important. The Ets-Hokin firm has been installing MN-1-B, 10 CM sets on the seagoing ships and MN-1-A, 10 CM and MN-2-A, 3 CM on harbor craft. Their recent installation on the Fish and Game Commission's boat *Albacore* is MN-1-A, 10 CM.

Total installations during the past year ran to ten G.E.'s, including the tankers *Salinas* and *Trinity* for Hillcone Steamship Company, the *President Cleveland* and

V. J. Bahorich, Superintendent Engineer for Pacific Far East Line, is pictured standing at the G-E radar which Ets-Hokin & Galvan installed on the "Flying Scud" during a 24-hour period.

President Wilson for American President Lines and the *Komoku* for the Bay and River Lines.

An article on the *Albacore* appears elsewhere in this issue.

ROYAL MAIL LINES' CHAIRMAN VISITS PACIFIC COAST

Walter C. Warwick, chairman of Royal Mail Lines, being greeted at San Francisco by J. W. M. Schorer, assistant Pacific Coast manager of Holland American Line, agents at San Francisco for Royal Mail. Warwick, who succeeded the late Lord Essendon as chairman in 1944, has been a director of the company for many years, and in addition to the chairmanship of Houlder Bros. & Co. Ltd., and Shaw Savill & Albion Lines, holds various appointments in many British shipping companies, including a directorship of Furness, Withy & Company, Ltd.

Coast Guard Stickers

Commander Ernest A. Cascini, USCG, District Director of the Coast Guard Auxiliary, announces that all craft passing inspection would receive red-and-white windshield stickers giving them immunity from being stopped and boarded during the boating season for routine inspection by Coast Guard cutter crews.

Commander Cascini said the Coast Guard would conduct a vigorous drive this summer against violations of safety regulations. At the request of the Coast Guard, the Auxiliary will make courtesy inspections where requested by boat owners, thus reducing the number of craft subject to boarding by cutter crews.

New Appointments Coastwise Line

Coastwise Line of San Francisco announces appointment of H. H. "Dutch" Pierson, well known Pacific Coast steamship man, as district manager for the Los Angeles-Long Beach area. E. A. Gardner, formerly district manager at Long Beach, has been assigned to a similar post in Alaska, succeeding D. J. Seid, who is returning to company headquarters in San Francisco.

By CARL JOHNSON
Consulting Engineer

In discussing the operation of engines, you many times hear it said, "She's running fine, let 'er alone."

But "fatigue" is a word used not only in connection with mortal man, but also in reference to the stuff of which engines are made. This brings us to the term "Preventive Maintenance."

The proof of the pudding is in the eating. Preventive Maintenance as practiced by West Winds, has cut costs over 50% in one year with all equipment at the end of that time in first class condition and capable of operating at the absolute minimum of upkeep cost.

Here is an experience: Picture a large diesel vessel, single screw, carrying refrigerated cargo across the Pacific, and depending wholly on its large main engine to deliver the goods. This engine is one of the unfortunate ones operated, as we say, with baling wire, pliers and crossed fingers until the inevitable serious breakdown occurs at the worst possible time and place. It comes in the form of fatigue of a vital part — the crank pin bearing bolts crystalize and snap, dropping the bottom bearing-half into the crankcase where further damage results, making it almost impossible to effect temporary repairs. In this case, with tugs standing by at the nearest port, temporary repairs were somehow effected and with a prayer, the engine started and the ship was lucky enough to limp half way across the Pacific at half speed.

Here the loss to the owners was minimized, but some are not so fortunate, so why the gamble? An ounce of prevention is worth a pound of cure . . . regular inspections and small upkeep jobs prevent major repair bills.

Floyd Nelson, new president of Bilge Club.

Bilge Club Annual

The annual meeting and election of officers of the Bilge Club was held April 19th at the Lakewood Country Club, Long Beach, and boasted a record attendance. Elected new president of the club for 1949-50 was Floyd Nelson of the Texas Oil Company.

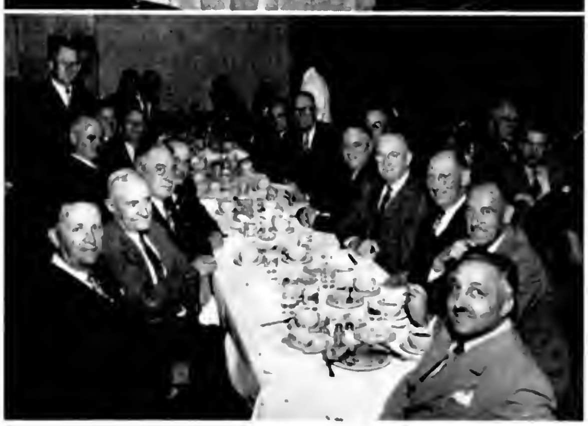
Highlight of the entertainment was an act by Nick Moro and Frank Yaconelli, headliners in stage, screen and television. Many other notables of screen and radio contributed to the success of the program.

Below: Nick Moro and Frank Yaconelli, entertainers who "wowed" the boys at the recent Bilge Club gathering.

Below, top: Joe Hare explains to a few of the Todd boys, "How To Win Friends and Influence Ships." In the foreground are Bill Kane and Capt. A. P. Brown, both of Todd Shipyards.

The first five across the table are: C. A. Sheldrake and C. A. Lane, both of Todd Shipyards; Joe Hare, U. S. Maritime Commission; David S. MacLagan and Edwin Pike, both of American Bureau of Shipping.

Bottom: Included in this group of "Happy Bilgers" are: Dan Dobler, Texas Oil; Art Pegg, International Paint; Burt Pegg, Marsol Corp.; John Eidom, Hancock Oil; Bill Courtiour, outgoing president of Bilge Club (standing, far left); Art Pegg, Jr., International Paint; Earl Archibald, Sunset Oil; Walt Richards, Wilmington Iron Works; Hamp Neergaard, Burns Steamship Co.; Joe Costello, J. M. Costello Supply Co.; Tom Forster, Forster Shipbuilding; Ray Jones, General Petroleum; Harry Summers, American Bureau of Shipping (ret.); Cy Cyrus, Union Oil.



Fighting Fire at Sea

(Continued from page 70)

Since the function of most of this false work is merely to present a fair appearance, it is unfortunate that it cannot be deleted entirely from naval construction. If appearance is important, provision should be made in such construction for some simple and quick means of opening up this false work for an examination of the void behind it. Furthermore, it is recommended that careful consideration and thought be given to the possibilities and to the practicability of keeping metal bulkheads cool by the application of water. Since less than 2/10ths of a gallon of water per square foot per minute will prevent steel from softening or eliminate heat inputs that would be dangerous and contribute toward the progressive spread of fire, perhaps water curtains can be designed that will provide adequate fire stops and at the same time, through drainage or recirculation, avoid accumulation of free water within the ship.

Clyde Williamson —Vice-President of California Filter Co.

The California Filter Company announces the election of Clyde F. Williamson to the position of vice president. Clyde is well known on the Pacific Coast and is remembered by the "Old Timers" for his work pioneering the Hall System of Boiler Water Treatment and Hagan control in both the Marine and Industrial fields. In his new position Clyde will be associated with Paul F. Bovard and E. C. Scott.

Bovard is well known on the Pacific Coast as an authority and Consultant Chemist on water problems in both the Marine and Industrial fields. Clyde was previously associated with Bovard from 1935 to 1938 as Marine Manager. The company then represented Hall Laboratories and Hagan Corporation. It was due to Clyde's efforts that Hall's System was installed on the S.S. *Point Lobos* of the Swayne and Hoyt Steamship Company. This was the first installation of the Hall System on the Pacific Coast in the Marine Field.

E. C. Scott of Scott Machinery Company will be General Manager of the California Filter Company. The company will consolidate its office, fabrication shop and laboratory with the Scott Machinery Company's present fabricating facilities. The company is enlarging its shop and laboratory facilities to give more adequate service to its clients.

The California Filter Company designs and manufactures water softeners and filters for both marine and industrial applications. The company has specialized in water problems for the past 25 years. With enlarged facilities, this expansion of both laboratory and shop will enable the company to render better consulting service on all problems connected with water in both marine and industrial fields.

Clyde Williamson

Herb Southworth (left) talks centrifugal castings with Sales Manager Philip P. Jefferis of Janney Centrifugal Castings.

Janney-Finished Centrifugal Castings

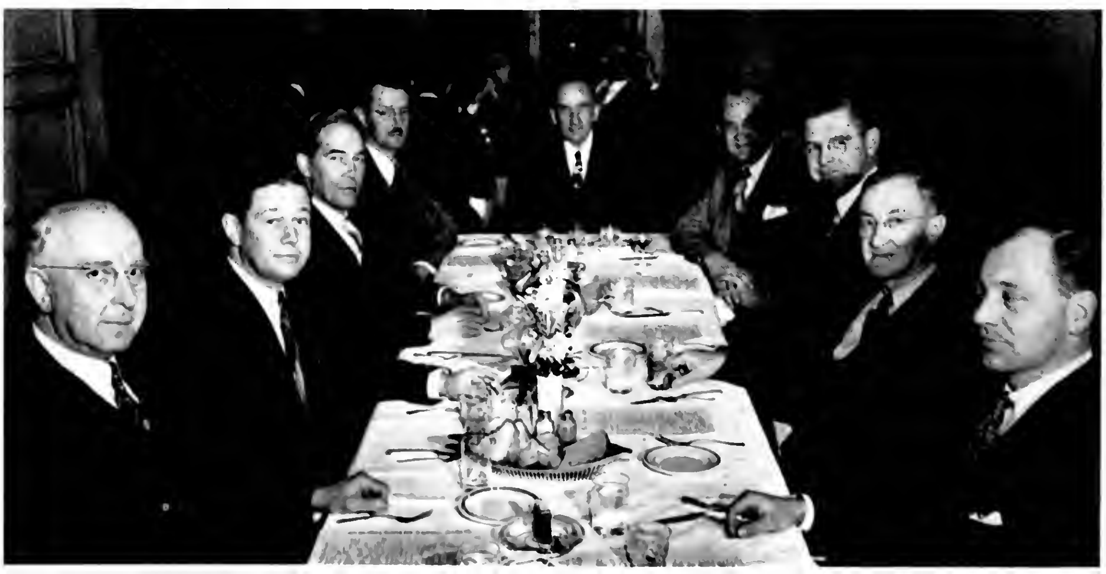
W. T. Janney, President and Treasurer, and Philip P. Jefferis, Sales Manager, for Janney Cylinder Company of Philadelphia, recently visited the West Coast. While in Los Angeles they participated in the American Society for Metals exposition in company with the firm's Pacific Coast representative, Herb Southworth.

The Janney line features finished machined products made exclusively from centrifugal castings of brass, bronze, alloy iron, stainless steels, Monel metal and Ni-Resist including diesel engine cylinder liners (wet or dry), pump liners, compressor liners, shaft sleeves for centrifugal pumps, rings, bushings, bearings, and miscellaneous cylindrical shapes.

Herb Southworth, from his headquarters at 845 Kirkham Street, San Francisco, announces that it is planned to carry a stock of finished Monel and bronze centrifugal castings in San Francisco.

ROEBLING OFFICIALS ON WEST COAST

Occasion for the recent luncheon party pictured above was the visit to the Pacific Coast of C. R. Tyson and E. G. Hartmann, president and general manager of sales, respectively, of John A. Roebling's Sons Company, Trenton, N. J. Their visit was for the purpose of holding a series of sales meetings. Seated at the luncheon table above are, left to right: Bill Linge, Sales Dept., C. J. Hendry Co.; Charles R. Tyson, President, John A. Roebling's Sons Company, Trenton, N. J.; Elmer Trask, San Francisco Branch Manager, John A. Roebling's; E. G. Hartmann, General Manager of Sales, John A. Roebling's; Phil Eldridge, Sales Dept., San Francisco, John A. Roebling's; Al Phillips, Phillips & Edwards Electric Corp.; John R. Higley, Pacific Coast General Manager, Otis Elevator Co.; Elden Parker, Purchasing Agent, Yuba Manufacturing Co.; Lee Adams, Jr., President, C. J. Hendry Co.



Foster-Wheeler Appointments

Vice Admiral Earle W. Mills, USN (Ret.), has been elected executive vice-president and a director

Vice Admiral Earle W. Mills

of Foster-Wheeler Corporation, and David McCulloch, formerly executive vice-president, has been named vice-chairman of the board.

Wartime Deputy Chief of the Bureau of Ships, Navy Department, and Chief of that Bureau since 1946, Admiral Mills recently retired from the Navy.

Admiral Mills graduated from the U. S. Naval Academy in 1917 and received his degree as Master of Science in Naval Engineering from Columbia University in 1924. He was awarded the honorary degree of Doctor of Engineering by the University of Louisville in 1944.

McCulloch joined Power Specialty Company, later to become part of Foster Wheeler Corporation, in 1906. He has served as executive vice-president since 1935.

Charles Lowe Company Handling 3-M Line Products

H. B. Hotchkiss, manager of Charles Lowe Company of San Francisco, and Ray Marshall, representative in Northern California for Minnesota Mining & Manufacturing Company's Adhesives and Coatings Division, have announced that the Lowe organization is now a distributor for 3-M Marine Line Products in the San Francisco Bay area.

Cochrane Acquires Liquid Conditioning Corporation

The Liquid Conditioning Corp. of Linden, N. J., was recently taken over by Cochrane Corp., Philadelphia, manufacturers of water conditioning equipment and steam specialties. The Liquid Conditioning Corp., manufacturers of equipment for the conditioning of water and other liquids under the trade name, "Liquon", will now operate as a wholly owned subsidiary of Cochrane Corp.

The engineering, sales and technical staffs of the two corporations will augment each other. S. B. Applebaum, one of the organizers and an officer of Liquid Conditioning Corporation, will be in charge of the cold water conditioning activities of both organizations, as well as the conditioning of liquids other than water. "Liquon" district sales offices are combining operations with existing Cochrane sales offices, thus further strengthening the field organizations of both corporations.

Refrigeration Components Enlarges Staff

Fred Esser, president of Refrigeration Components.

Refrigeration Components in San Francisco, an organization owned and operated by Fred Esser, is the only major firm of its kind that is entirely dependent upon the marine industry.

Fred Esser, in announcing several additions to his staff. reviewed his career in a recent interview. He hails from Seattle and Alaska where he received preliminary sea training as an oiler aboard inland and island vessels. He has been engaged in marine refrigeration work since 1921. Esser established his own business in 1945. Associated with Esser in his headquarters at 15 Steuart Street is Ken Zappettini, Sales Manager, and Ed Driscoll, Stock Manager. These three men have marine experience aggregating 28 years.

A device of considerable value to the marine refrigeration field is Refrigeration Components' cleaning system. This small compact device is made for use on all vessels and operates on 110, 220 and 440 volts AC or DC. Function of the cleaning system is to eliminate all waste matters including scale, water, salt water, oil sludge and corrosion from coils, condensers, receivers and the entire system.

An interesting job recently performed by Refrigeration Components was aboard the passenger carrier *Imperial*, at Todd yard, Ala-

Ken Zappettini, Sales Manager, Refrigeration Components.

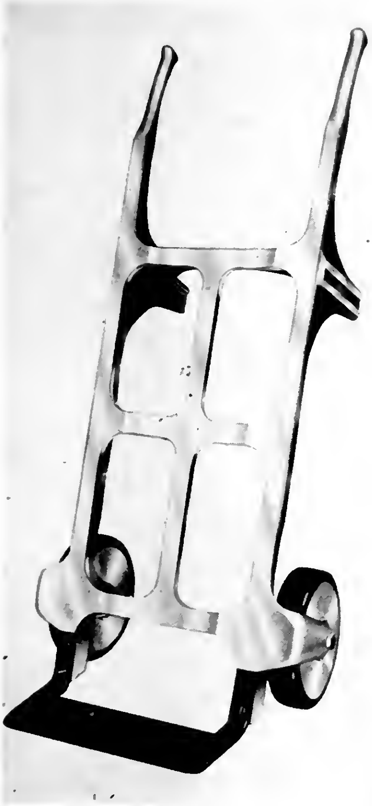
Left to right: Frank Atwood, Al Norris, Frank Meyskens, Ed Driscoll, H. J. Wrigley, Jr., A. Francken and W. T. White, Jr., staff of Refrigeration Components.

meda, for the Turkish government. Among the well known steamship companies on the records of Refrigeration Components are American President Lines, Matson Line, American-Hawaiian, Luckenbach, Pope & Talbot, Moore-McCormack, U. S. Army Transport Service, American Mail Line, Pacific Tankers, Pacific Far East Lines and Grace Line. Refrigeration Components is especially proud of its ability to meet calls for material and parts required for all types of marine refrigeration machinery.

Multi-Purpose Hand Truck

Now being marketed by Aerol Co., Inc., 2820 Ontario St., Burbank, Cal., is the new Aerotruker, a multi-

Aerotrucker



purpose hand truck. The Aerotruker may be operated throughout its normal life without greasing, for the Aerol wheels with which this hand truck is equipped revolve on Timken Tapered roller bearings that are factory-packed with special waterproof lubricant. A rugged cast-single-unit frame, of light-weight, strong aluminum alloy, eliminates constant tightening or replacement of loose members, and insures perfect stability under heavy loads.

The Aerol sealed-for-life aluminum alloy wheels on which this hand truck rolls have solid rubber tires guaranteed not to separate from the wheel, and the rubber tread is oil and water resistant.

Visits Coast

S. Inglis Leslie, chairman of the Board of the Leslie Co., snapped recently in John Cordes' offices in San Francisco. Mr. Leslie is combining business with pleasure in his visits with distributors on the coast and in Hawaii. ▶

Promoted by Radiomarine

Lester T. Gates (above) has been promoted to General Service Manager of Radiomarine Corporation of America. He will supervise the installation, maintenance and servicing of all the company's marine communication and electronic navigational products and direct the service activities of 23 wholly-owned Radiomarine service stations, and numerous affiliated service companies throughout the country. He joined RCA's marine division in 1925.

Hurley Marine Works Reopen

Hurley Marine Works announce the reopening of their plant at 491 Embarcadero (foot of Fifth Ave.). Oakland, Calif. Their telephone number is GLencourt 1-6350.

Marine Exchange Committee on Sales Tax

One of the major activities of the Marine Exchange of San Francisco is the endeavor to have amended the California State Sales Tax Law so as to exclude the sale of marine supplies, California being the only state which continues to assess sales tax on offshore transactions.

Pictured above is the committee working on this and other matters vital to the maritime industry. Seated, left to right: Dick Hughes of Tubbs Cordage Co., John Cordes of Cordes Bros., John Parker of the American Marine Paint Co., and Eddie Martin. Standing, left to right: Paul Faulkner, Pacific Marine Review; Byron (Tote) Haviside; M. A. Cremer of the Marine Exchange; George Swett, George E. Swett & Co.; Louis Ets-Hokin, Ets-Hokin & Galvan; T. Douglas MacMullen, Pacific Marine Review. Others on the committee are Lee Adams, Ed Snyder, Tom Short, Ed Hough and Herman Nichols. Ets-Hokin is chairman.

Light-Weight Truck

A relatively small, light-weight, electric power industrial truck for fast maneuvering and tiering loads that are not excessively heavy has been developed by Elwell-Parker Electric Co., Cleveland, O. Designed for requirements in large merchandise warehouses, it is equally applicable in many manufacturing and shipping departments.

This newest truck in Elwell-Parker's "Air Rights" series weighs only 4550 pounds including battery, yet it can safely manipulate loads up to 2000 pounds. Compact, it can maneuver in narrow aisles and areas. Length overall with 30-inch fork is only 96 inches; width 32½ inches. This with straight-line steering mechanism enables it to turn in 60-inch intersecting aisles and in 109-inch right-angle aisles. A low center of gravity contributes to safe-handling under all working conditions.

Straight travel speed with full load is 5¼ miles an hour. Maximum height of lift of forks is 121½ inches. Lifting speed loaded is at a rate of 28 feet per minute; lowering load rate 45 feet per minute. Safety valves control lifting and lowering.

A dual-cylinder, low-pressure hydraulic system operates the lifting mechanism. Cylinders placed at opposite sides in the upright column provide extra unobstructed vision for the operator.

Construction of the truck, motors, controls and other mechanical features correspond to those in Elwell-Parker standard type trucks. The fork is interchangeable with other E-P standard attachments.

Completes Thirty Years Service

William F. Humphrey (left), President, Tide Water Associated Oil Co., warmly congratulates Harold J. Wilson, Manager of Marine Dept., for having completed 30 years of continuous service with the company. Wilson started with the company as a Construction Engineer.

KEEP POSTED

New Equipment and Literature for Yard. Ship and Dock

The new Westinghouse Type MU-1 Marine Radar is a specialized design, incorporating all of the features necessary to meet

MU-1 Marine Radar

varied operational requirements in detecting targets at ranges between 80 yards and 40 miles. The equipment in all details meets (and in many, exceeds) the established commercial radar specifications recommended by the U. S. Coast Guard and the Lake Carriers' Association.

A newly developed 12½ inch flat-face scope provides a usable area of 95 square inches for the PPI (Plan Position Indicator) display. To provide ease and accuracy in locating targets at ranges between 80 yards and one mile, a one-mile range is provided along with two-, four-, eight, 20-, and 40-mile ranges.

The MU-1 design includes a new and greatly improved sea suppressor control. Once this control has been set in a given position, constant target intensity above sea return is provided without further adjustment.

American Marine Paint Booklet

The American Marine Paint Company has available a booklet on marine paints describing their boot-topping and deck finishes, topside finishes, and machinery and cabin finishes, together with color samples. Varnishes and marine whites are also described and their germicide compositions for steel hulls and Cape Cod Copper Paints for wooden hulls.

The American Marine Paint Company maintains exclusive franchise with all property rights to the formulae for Navy-Plastic, the U. S. Navy hot and cold plastic shipbottom paints and also related compositions available to private industry. Special Navy-Plastic technical bulletins are available on request.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

....Issue. Page No...................

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(Identify by name of manufacturer and catalog)

NAME..

BUSINESS..

ADDRESS..

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New Lubricating Oil Testing Kit

To provide means for quick and simple measurements of the condition of lubricating oil, the Gerin Corporation, of Red Bank, N. J., has added a new equipment kit to its line of oil testing sets. This outfit is especially designed for use by mechanics and engine attendants in garages, power plants and railroads.

The Gerin Kit for oil inspection.

The equipment kit, which is portable, measures the four dangerous classes of contaminants: 1. Change in viscosity due to fuel dilution or other causes. 2. Amount of the asphaltic and other oil breakdown substances considered responsible for deposits. 3. Amount of dirt, metal particles, other solids and water. 4. Acidity, showing whether corrosion is possible.

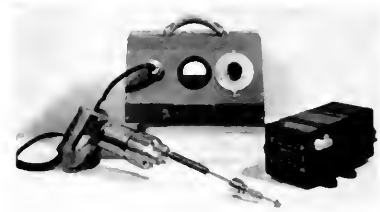
The oil from four engines can be analyzed for all four classes of contaminants in twenty-five minutes, so that changes and trends can be detected which give advance information that mechanical or operating troubles are in the making. The tests are also a necessary guide to making oil and filter changes according to their actual condition instead of according to time or mileage.

Dudley Electronic Condenser Tube Expander

The Crane Packing Company of Chicago has announced an electrically controlled tube expander capable of precision tube expanding even when operated by inexperienced workers. Use of this development, known as the "Dudley Electronic Control," increases the speed of expanding tubes up to 50 per cent in most cases, eliminates tube over-expanding, reduces erosion possibilities, and extends tube life.

The unit, as shown in the illustration, consists of an electronic precision tube expander control, an automatic voltage regulator, the electric expander driving motor, and the precision tube expander. It is simple to use, and permits the most inexperienced operator to perform perfect workmanship.

One of the special features of the tube expander is the ball bearing stop collar which remains stationary when in contact with the tube end. It transmits the thrust load to the ball bearings contained in the housing, thus eliminating tube end cutting and frictional heating.



Electrically controlled tube expander. Photo shows assembly, electric driving motor, "Franklin" expander and voltage regulator.

Lurline

(Continued from page 76)

operating costs on this type of vessel make it uneconomical to handle cargo of any sort which cannot be loaded and discharged in the time required for accomplishing the functions necessary to passenger operations.

On the *Lurline* the most extensive undertaking in this connection was the renewal of the main portion of the cargo and ship's service refrigeration plant, located in the after holds. The original plant had consisted of four motor-driven CO_2 compressors with a brine circulation system and with wood-lined boxes insulated with granulated cork. Ship's stores and cargo freezer boxes were coil lined while cargo chill boxes were fitted with "bunker" coils and fans. Not included in this renewal was a small supplementary plant consisting of two boxes located in the forward 'tween deck which had been installed just prior to the war using a Freon 12 compressor system, boxes lined with block cork, and motor-driven direct-expansion-type diffusers, all of which were retained intact except for overhaul of machinery and renewal of insulation on decks.

Postwar demand by shippers of refrigerated cargo was for refrigeration space capable of assured temperatures of 0 degree F or below. An inspection of the *Lurline's* installation indicated settlement and deterioration of granulated cork insulation, which, combined with the inherently low critical temperature of condensation for CO_2, precluded assured temperatures in this range on a vessel operating in semi-tropical or tropical waters. Under Coast Guard rules granulated cork and wood-type installation would not be acceptable on a ship under the authority of Subchapter M nor could Public Health Service issuance of "Certificate of Ratproof Construction" be expected with these materials. The entire installation was removed therefore and the boxes reconstructed with block cork fastened entirely by adhesives to the ship's structure (i.e., no through metallic fastenings). They were then sheathed with transite-type panels, also secured with adhesive rather than metal fastenings. It is interesting to note that, in spite of the obviously superior features of this type of construction over the original installation, the Public Health Service refused to accept the transite panels as a satisfactory ratproof medium and it was necessary to apply a layer of metal screening between the cork and the transite in order to have the installation accepted as ratproof. The CO_2 plant was replaced in its entirely with a conventional Freon 12 plant of slightly smaller power imput but of substantially greater refrigerating capacity under tropical conditions with high circulating-water temperatures. The brine-circulation system was retained, but in all cargo boxes modern motor-driven fan and coil diffusers were substituted for the original wall or "bunker" coils.

The arrangement of cargo winches, booms, and rigging remained substantially as it had been before the war, but all material was completely rebuilt or renewed to assure satisfactory uninterrupted service. The winches, which were among the earliest electric-driven marine winches on the West Coast, are not as powerful as would be installed in modern practice, but their performance is satisfactory with the loads encountered in this type of service. The filling in of the forward well deck necessitated a rearrangement of booms and rigging to assure adequate drift for loads over the raised deck without diminishing outreach. Additional cargo sideports were installed for access to the after end of No. 4 hold, so that both No.

2 and No. 4 holds now have sideport access at both forward and after ends, both sides, and No. 1 and No. 3 from one end, both sides. Trimming hatches were provided where possible in the way of sideports to permit loading lower spaces through sideports and conveyor systems as well as through the center hatch. A system of spar batten corrals was provided in the way of each cargo sideport to permit last-minute loading of mail and light package goods after the remainder of the holds have been closed and dunnaged-off for sea. A spar deck, installed just before the war in No. 2 hold, was retained and made permanent to handle the large number of uncrated automobiles encountered in the Hawaiian trade.

Passenger baggage facilities were given particularly careful study since travelers today prefer to keep baggage in sight, to bring baggage along at the last minute before boarding, and to have it on the dock waiting as soon as the gangway is lowered in place. Since the airlines have worked up an almost universal feeling of resentment on the part of travelers who fail to see the consistency of speeding up travel in the air only to stand around and wait for baggage after landing, and since passengers traveling by ship can take advantage of the large baggage allowance, it is wise for the ship operator to endeavor to make each passenger's last contact with the ship a happy one by having his baggage on the dock as soon as possible after he decends the gangway.

In its original design the *Lurline* had been fitted with a baggage room at F deck level, amidships. Except for individual small trunk rooms for occupants of the ten deluxe and lanai suites, all baggage not carried in staterooms was carried in this central baggage room. Access to the baggage room was through elevators connecting to a sideport at E deck, and the necessarily slow, reciprocating operation of these elevators created a severe bottleneck in baggage handling. Stateroom baggage was handled on open or promenade decks near a cargo hatch to be distributed later manually to the various decks and rooms. To alleviate these conditions, the reconversion included a number of effective, though simple, improvements. The baggage elevators were eliminated completely and a system of permanently installed, reversible, power-operated conveyors was installed, permitting a continuous uninterrupted flow of baggage from the dock to or from the baggage room. After the elimination of the forward hatch-top swimming pool, a pontoon-type cover or platform was installed about 10 feet below the top of No. 2 hatch trunk, at C deck level. Shortly before sailing, this is closed, creating a large, protected space into which is lowered, via cargo gear, most stateroom baggage except small items carried up gangways by passengers and porters. This is then sorted in a baggage room immediately aft of the hatch trunk for distribution by stewards to individual staterooms. A built-in conveyor transports D deck baggage from this room to another baggage room on D deck. Throughout B, C, and D decks are a number of smaller trunk rooms or baggage rooms accessible to passengers and stewards for stowage of larger baggage, empty suitcases, etc.

By the methods described, all of which aim at a continuous flow of baggage, handling has been so speeded that the real limitation now is the handling, sorting, and inspection of baggage on the dock, since it is these functions which eventually create a "log-jam" that results in momentary interuptions of the mechanical facilities on shipboard. Nevertheless, by the time passengers disembark, say their farewells, and line up transportation, their baggage usually is available to them. It may be mentioned

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Lurline

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that the number and size of trunk rooms provided, which were based on prewar experience with baggage, have turned out to be more than adequate, due to the war-established tendency to use more small handbags and suitcases and eliminate trunks as far as possible.

Service Equipment and Spaces

The general arrangement of the main and crew galleys as originally installed, with minor modifications developed though years of operating experience, left very little need for major improvements during reconversion, and this same general arrangement still remains. Nevertheless, it was necessary to strip completely and re-outfit the galley spaces. This apparent inconsistency was due chiefly to the fact that the individual items of galley equipment are of such nature that it is more economical to replace them completely than to attempt repairs or refurbishing, even though these may be relatively minor in extent. The Public Health Service now has requirements, not previously applicable, which made such water-consuming equipment as washing machines and sinks, of which there were many in the galley spaces, entirely obsolete, The same agency, in connection with its ratproofing requirements, now forbids installation of gutterways under equipment in galleys, and, except by special permission and under special conditions, will not tolerate the running of drain lines in the overhead of such spaces. Finally, the obvious superiorty of stainless steel, now available for use in dressers, bins, racks, refrigerators, and similar applications, makes it undesirable to retain black or galvanized steel in these locations with consequent higher maintenance costs and poorer cleanliness and appearance. Substantial revisions were necessary in galley ventilation, not only to bring the amount of ventilation up to present standards, but also because the air conditioning of the remainder of the vessel rendered obsolete the original design in which the galley was fitted with exhaust ventilation only, all supply air coming from leakage from passenger and crew's quarters.

In line with the policy of adequate room service for first class passengers, the number and size of deck pantries were increased. Two pantries were fitted on each of the principal first class passenger decks, located in the centerline area, and each completely outfitted with refrigerator, silex, and hot plates for minor cooking, plus food warming and storage equipment and the usual sinks, racks, creels, bins, etc. In addition, somewhat larger pantries were provided for service in public spaces and on open decks.

In the past it has been so common to overlook the necessity for adequate lockers, slop sinks, and similar minor but important service essentials that are readily apparent only to operating personel, that a careful study was made in this case, not only to determine maximum requirements, but also to utilize every available small corner or recess for this purpose. As a result, the *Lurline* now has, in addition to the trunk rooms and pantries previously mentioned, a total of 88 stewards' lockers and 19 slop sinks distributed throughout the passenger and crew spaces. In addition to improved crew relations and reduced accident hazard, this has resulted in notably improving service to passengers by having gear available when needed, and by minimizing the practice of leaving brooms, mops, linen, vacuum cleaners, and similar items around in passageways and staterooms.

Such service facilities as the laundry, tailor shop, print

shop, barber and beauty shops, and novelty shop remained essentially as before the war, equipment being throughly overhauled or renewed in each instance, and relocated or rearranged where the general rearrangement of surrounding quarters required.

Both as an increased service to passengers and in line with the current trend, common to nearly all business, toward an increased volume of "paper work" and accounts, the Purser's Department had increased on the *Lurline* from an original 12 to a present 23. This increase in personal, in addition to necessitating additional living quarters as explained previously, also requires more working space and equipment. During the reconversion the Purser's Office was enlarged considerably, both in first and cabin classes, and a separate paymaster's office was provided in the crew messroom area to take the burden of the crew payrolls off the main purser's staff office.

Miscellaneous

The original boatage of the *Lurline* had consisted of fourteen 30-foot oar-propelled boats, four 26-foot nested, oar-propelled boats, two motorboats and two work boats. All except the work boats were of sheet steel. Through the years maintenance of these boats had been high due to corrosion from stack gasses and exposed location aggravated by the wartime practice of eliminating boat covers. Only a few boats had been replaced previously, the replacement 30-foot boats being required to be of the hand-propelled instead of oar-propelled type. The reconversion would necessitate replacement of the remaining 30-foot boats. The owners decided a complete new set of 30-foot boats of aluminum construction in order to determine in service the relative maintenance necessary as opposed to the steel boats and to gain the additional advantage of a small saving in topside weight. To date, indications are that the maintenance of the aluminum boats will be very appreciably less than that of the previous steel boats. Boat covers are not being used, thereby eliminating the cost of maintaining covers, which had been high, and also saving time (and overtime) spent in taking off and putting on covers at every boat drill. An interesting sidelight in connection with the boat renewals is that, because the new 30-foot boats were fitted with Rottmer release gear as required for new boats, it was necessary to rebuild the 26-foot boats to fit them with Rottmer gear, in accordance with the requirement that only one type of release gear be used for all life boats on one vessel. In addition to renewal of the boats themselves, all gravity davit arms and considerable number of davit tracks were renewed, and all davit tracks were fitted with additional strengthening to conform with rule changes developed since the original installation. The boat winches, although not requiring modification, were stripped completely and shop rebuilt in order to insure reliable performance and Coast Guard acceptance under the rigid final tests applied.

At the instigation of the industrial designer, a number of minor alterations were made in an endeavor to modernize the outward appearance of the vessel in profile. Principal among these was the removal of the umbrellas from the stacks. To minimize smoke nuisance and offset possible disturbance of air streams due to removal of the umbrellas, aggravated by the increase in height of the forward deck house, new top sections were added to the inner stacks, decreasing the outlet area and increasing exhaust gas velocity. The original external whistles and their bulky access ladders and platforms were eliminated in favor of internal whistles. The house letters were increased in size. These alterations to the stacks, combined with the fact that the surrounding house structures were approximately 8 feet higher than prewar, resulted in a marked increase in the apparent diameter and decrease in apparent height of the stacks. A number of minor changes were made in the contour of the side plating, particularly at the break of the houses, the length and flare of the fashion plate at the bow was increased for functional reasons, and these, together with the elimination of the forward well deck break, combined to give an over-all impression which, though not "streamlined," was certainly more trim and ship-shape than heretofore. The effect of these various modifications is apparent from a comparison of Figs. 1 and 2. (Frontispiece, page 40).

Conclusion

In the foregoing sections the author has endeavored to describe the principal features of the physical reconversion of the *Lurline,* to interrelate the various parts in their effect on each other, and to point out the influencing factors in trade and travel customs and in the laws and rules of governing bodies which influenced the ultimate design and which resulted in a vessel of radically different characteristics from those originally built into the same hull 15½ years before. It often has been noted that one cannot stop with just one single change in a ship's design, and this is particularly true of large passenger vessels in which the entire design represents a closely interrelated group of components, each weighted and balanced—and compromised—in accordance with the demands of a thousand others. The naval architect becomes used to

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Automatic Combustion Control

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boiler: The master sender, the transfer valve and relay, the damper operator, the ration regulator and the fuel valve.

The master sender converts changes in steam pressure to changes in air sending pressure. The steam pressure is impressed on a bellows that exerts force on a beam which is balanced by spring tension that can be varied for various pressures. The movement of this beam is transmitted to an escapement valve causing the sending pressure to change in accordance with changing steam pressure. An increase in steam pressure gives a corresponding increase in sending pressure which is sent through the transfer valve and relay, to the pilot valve on the damper operator. The transfer valve is used to switch from manual to automatic and the relay is a form of air balanced reducing valve with a spring loading so that the load can be divided in any proportion between the other boilers.

The damper operator is a piston type power cylinder of 20 sq. in. area with 100 pounds air supplied to move the piston and 0 to 60 pound pressure applied to the diaphragm of the pilot valve which has a variable loading spring opposing the sending pressure so that every increment of change of sending air pressure will move the damper a given amount. Thus we set up a combustion air flow that has a definite relation to the steam pressure change.

There is no connection between the master sender and the fuel system. The variable ratio regulator and the fuel value proportion the fuel pressure to actual air flow. In most systems the ratio regulator measures air flow across the burner register by measuring the differential on a sensitive diaphragm between the wind box pressure and the furnace pressure. Thus you will see that each register is being used as an orifice so that when a burner is not in use the register must be closed to get a true reading.

The measure of air flow that the ratio regulator has received is converted to a sending pressure that is a proportional function of the draft loss in accordance with the type of burner used, either return type or pressure type. An adjusting knob sets a spring tension so that the ratio can be varied with various sized burners.

The sending pressure generated by the action of the ratio regulator is sent to the diaphragm of the piston type oil valve which gives an increase in burner pressure with an increase in sending pressure. The burner pressure is imposed on a bellows in the valve that tends to counteract the sending pressure. Thus we get a definite pressure relation to air flow regardless of the number of burners in use. This means the only manual change needed is to cut in and out the burners and move the registers accordingly when maneuvering. It will be noted in this system that steam pressure increases air pressure and air pressure increases oil pressure. Thus in the event of loss of air flow the oil flow is cut back accordingly. If steam pressure controlled oil flow the opposite would logically be the result which would make for a possible casualty.

Maintenance and Safety Precautions

I believe it is good practice to have any equipment serviced once a year. The only important maintenance program in between blowdown periods for pneumatic control equipment is to keep the air clean by blowing

down the air tank periodically and the air filters at the board daily and also lubricate the damper linkage so as to prevent sticking. In a great many cases poor operation is blamed on control equipment when the cause is found to be dirty burners, sticking linkage or mixed burner sizes in one boiler.

Excessive oil temperature can contribute to dirty burners and high superheat as well as fouled oil heaters. If oil temperature is carried as low as good combustion permits we get a better proportioning of air to oil, and less heater maintenance.

It is obvious that since we are measuring oil pressure and air flow if we change the temperature of either or both we change the volume pressure characteristics that we are metering and a ratio adjustment is then necessary.

In some types of boilers where refractory is limited due to water walls and floors it is necessary to limit the minimum firing rate of the equipment due to the possible loss of ignition as the furnace cools at low loads.

With proper care and a realization of the functions and limitations of the individual design, automatic combustion control will pay dividends year in and year out on any steam boiler plant.

Hughes Elected Director of Marine Exchange

Lloyd B. Hughes, assistant port manager in charge of operations and traffic, Port of Oakland, was elected to the board of directors of the Marine Exchange, Inc.

Hughes replaces Col. John Kilpatrick, American President Lines, who resigned because of ill health.

The new director, a captain in the Naval Reserve, was captain in charge of inland transportation on the staff of Admiral Ingersoll, Commander, Western Sea Frontier,

Capt. Lloyd B. Hughes, USN., Ret.

during World War II. He was prominent in the commissioning of the Oakland Naval Supply Base.

Prior to the war, Hughes was assistant general traffic manager of Montgomery Ward and Company.

G-E Electronic Navigator Described

The General Electric Electronic Navigator, Type MN-1-B, is described in their booklet, "The Maritime Radar." The Electronic Navigator is a dependable and accurate commercial radar instrument designed specifically for maritime service. Even in thickest weather, the Electronic Navigator is constantly alert to surface obstacles, enabling a ship's master to pilot his ship with safety. It is unaffected by static or interference from ship's electrical equipment. A direct-viewing instrument, it requires no calculations for course and bearing determination. It is small, compact, and requires a minimum of space, and installation is easy and economical.

The General Electric booklet describes the operation of the Electronic Navigator and gives complete details of the equipment. Copies of the booklet may be obtained from the Electronics Department of General Electric, Electronics Park, Syracuse, N. Y.

Chrome Lock

Chrome Lock is a specially compounded and impregnated felt, containing zinc chromate as a corrosion inhibitor. It is used for protective gasketing or sealing between all types of faying surfaces such as flanges and lapped or butted joints. Under bolted, screwed or nailed pressure the resins traverse within the felt and are also extruded onto the faying surfaces in sufficient quantities to form a positive dam. The resultant seal provides both the exclusion or retention of air, water, dust and many other materials.

Chrome Lock in Tape Form

Chrome Lock is used for sealing air conditioning piping, and deck drainage aboard ships and carries Navy Spec. No. 33F8, Type N. It is used as both an orginal manufacture and replacement seal.

Chrome Lock is easy to apply, remains pliable indefinitely, and maintains a positive seal for the life of the installation. It prevents rust in new installations and arrests corrosion in old installations. Chrome Lock completely inhibits electrolytic action between dissimilar metals.

Chrome Lock comes in any width from 3/16" to 72" and is available in the following lengths: 100 ft. - 1/32" and 1/16" thicknesses; 50 ft. - 1/8" thickness; 25 ft. - ¼" thickness. Chrome Lock is also available as a stamped gasketing to fit individual requirements.

A descriptive folder (P-1021) and free sample may be obtained from Products Research Company, 5426 San Fernando Rd., Glendale, California.

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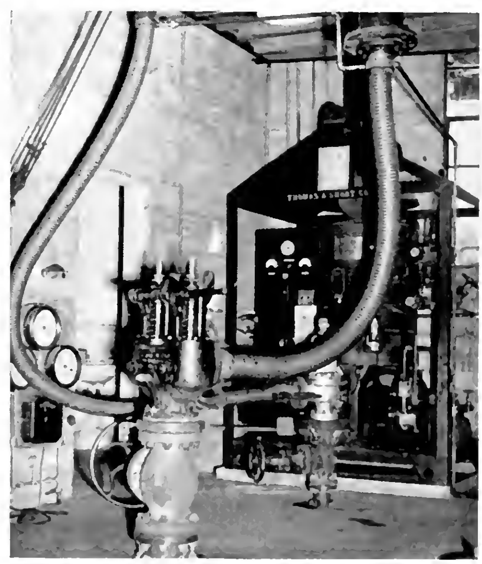

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Logarithms

(Continued from page 87)

rule, too, and it will help you in your problems in that correspondence course." Frank started to leave, turned and said: "I'll be down in the shaft alley a while starboard side. I can't seem to get the oilers to keep enough water leaking through the stern tube packing gland and am afraid of too much wear on the packing. They seem to think that leaking water means a sinking ship. See you later."

Painted Machines Safer to Operate

To reduce the number of accidents caused by eye fatigue and labor turnover due to employee boredom, scores of manufacturers are using barrels of vari-colored paints in the interior of their plants.

One plant found that by painting machines green, walls yellow, and by smearing dashes of orange at strategic points, it reduced by 38% the number of days lost through accidents. Absenteeism fell from 5% to 2%, and labor turnover from 4.5% to 4%. Another company found that painting machines increased production 10 to 12%, and reduced accident rates from $1.21 to 18 cents per man over comparable periods.

Painting the machines in ships' engine rooms has long been followed as an accident deterrent, and is becoming a standard practice. Deck machinery, also, is being painted in identifying colors for safety purposes.

Lurline

(Continued from page 115)

dealing with his problems of today, which will be the ships of tomorrow, and only when he indulges in retrospect does he realize the profound influence of the "little changes" which have been established through law or custom but which, cumulatively, affect nearly every aspect of ship design. Even then, he must compare one ship, built 10, 15, or 20 years ago with another, building or projected, which may have entirely different dimensions, capacities, speeds, or other characteristics, or which may be intended for an entirely different trade route. But in the *Lurline* reconversion all these latter characteristics may be considered as constants, and it is possible to see more clearly the impact of each factor as it influences the whole design.

It is impossible, of course, to predict with positive assurance the future of seagoing surface transportation many years hence. Like the broader aspects of the current dispute between the proponents of seapower and airpower on a military level, it may only be surmised that the ultimate result will be in the nature of a compromise in which each will find its own field and in which, in the long run, both may be required in greater numbers than presently contemplated. It can be said, however, as a result of the completion of the *Lurline's* reconversion and the lessons of her first year of operation, that there is no indication that surface transportation is about to pass out of the picture. The *Lurline* has been enthusiastically received by the traveling public, and there is every indication that, when safe, comfortable modern passenger ship travel is offered at reasonable prices, public confidence and support will continue.

Now Vice-President

John A. Logan, snapped on a recent visit to San Francisco, has been named vice-president and Southern California manager of the C. J. Hendry Company. His headquarters are in the San Pedro warehouse-store.

Dynatork Drive for Industrial Trucks

The Clark Equipment Company of Battle Creek, Michigan, recently introduced the new Clark Dynatork Drive for use on industrial trucks. Installed on a Clark gas-powered Utilitruc fork-lift truck of 6000-pounds capacity, the Dynatork Drive was demonstrated at the third National Materials Handling Exposition.

Power from the truck's engine is tarnsmitted by means of magnetic induction. Two magnetic coils rotate with the flywheel and are the driving members—one coil for Forward, and the other for Reverse.

A selector-switch on the steering column provides finger-tip control of truck movement. The switch has three positions: forward, back and neutral.

Among the benefits which the manufacturer claims from use of the Dynatork Drive is the greatly increased amount of work the fork truck can perform, elimination of wear and tear on the machine itself, and greatly increased safety for both truck operators and loads.

Full information concerning the new Dynatork Drive is contained in an eight-page bulletin which may be obtained from the Industrial Truck Division of Clark Equipment Company, Battle Creek, Michigan.

"Dynatork Drive" in phantom.

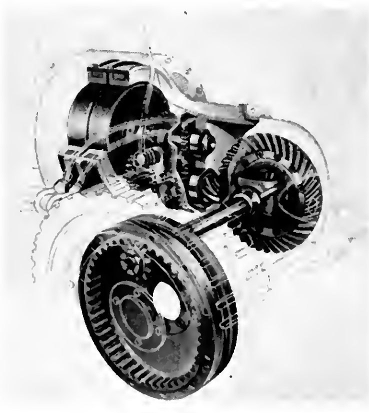
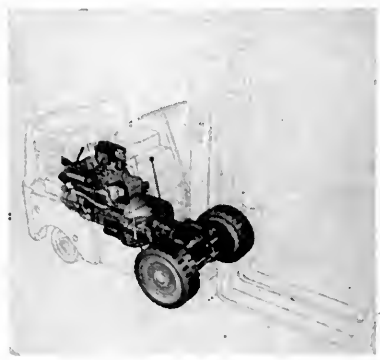


Photo-diagram shows complete power-transmission including new "Dynatork Drive" as a compact integrated unit assembled in Clark fork-lift truck chassis.



Johns-Manville Packings

Johns-Manville has available a new publication, "Johns-Manville Packings for the Marine Industry." For the user's convenience, the various packings are arranged by type of service—crude oil, hot water, gasoline, etc—rather than by style. Materials are recommended for all general reciprocating service. Illustrations and short texts cover a total of thirty-seven styles of J-M packings and gaskets which have applications in the marine field.

Copies of "Johns-Manville Packings for the Marine Industry" can be secured from Johns-Manville, 22 East 40th Street, New York City.

U. S. Navy Plastic Paint Franchise Obtained by American Marine Paint Company

John Parker, President, American Marine Paint Co.

One of the important wartime naval discoveries is now available to private industry for the first time. According to an announcement recently released by President John Parker of the American Marine Paint Co., his firm has acquired the exclusive commercial franchise to manufacture and market the new authentic U. S. Nacy plastic shipbottom paints.

With the pressing need for the maximum operating speed, maneuverability, and long, uninterrupted service for its fighting ships, the U. S. Navy encouraged endless research for improved anti-corrosive and anti-fouling underwater paints. Captain A. S. Pitre, U. S. N., who now holds the patents, devoted many years of laboratory experimentation to the development of his formula, which was adopted as the composition of the official Navy plastic paints.

So satisfactory was their protection against the sub-surface attack of barnacles, teredos and underwater grass that the Navy, during and since the war, has used them exclusively on all its steel bottom craft. The British Navy, having access to the new process through the allied materiel exchange, adopted the "cold" application of plastic paints for its particular requirements, and continues their exclusive use on all their steel bottom vessels.

To private shipping operators the Navy plastic paints will provide the same unparalleled hull efficiency so urgent to naval operations. Not only is the destructive effect of marine growth reduced to a minimum heretofore not achieved, but through the elimination of its "drag", maximum operating speed and fuel economy is attained. The importance of these factors becomes apparent when considered in the light of official Navy statistics, disclosing slow-down of as much as five knots an hour and a fuel consumption increase up to 75% due to sub-surface fouling.

Perhaps of even more immediate interest to the small profit margins of seaborne transportation is the dollar economy of the Navy plastic paints. The long, non-productive periods when ships are out-of-service have always been a deadweight factor of considerable expense to ship operators. Frequent and costly dry-docking charges for cleaning, scraping and re-painting hulls are materially reduced by the long-lasting protective qualities of these anti-corrosive and anti-fouling plastic paints.

Plans for the distribution of the official U. S. Navy plastic shipbottom paints are now in progress at the San Francisco headquarters of the American Marine Paint Co. Orders are now being booked for early delivery to Pacific Coast ports from the company's offices in San Francisco, Seattle and Wilmington. Future distribution plans call for marketing in other sea coast and waterway ports throughout the country and abroad. The company is now accepting applications of prospective distributors and sub-licensees in the United States and some foreign countries.

325 Volumes on Ships Added to Stanford Library

The story of the seas—related in 325 volumes on ships and ship modeling—is the most recent addition to the Hopkins Transportation Library at Stanford University.

The unusual gift, announced recently by Dr. Raynard C. Swank, director of university libraries, is from the estate of Steward Parker Elliott, who for years conducted a hobby department at The Emporium in San Francisco.

The Elliott collection, which includes blueprints for model ships, ranges from pirate tales to accounts of heroism at sea.

Pacific MARINE REVIEW

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Pacific MARINE REVIEW

Salesmen for Shipyards

THE shipping and world trade industries have many objectives in common, one of which is more trade; and for this they are dependent on each other. A top shipyard official remarks that the *shipyard's* greatest interest is in more trade. More trade means more ship supplies, more ship repairs, more ships.

There are few industries as diversified as shipping—or as basic. And so many things depend on it. Shipping is the bread and meat of port cities, and the bridge by which defense forces keep wars at a distance. Ships are the tools of agriculture for disposing of a third of the crop, and the means through which "backward areas" of the world will be industrialized under an extension of the Truman doctrine. Our vessels are economic problems in times of peace but they are "ships of glory when the band begins to play."

In the recent World Trade Week observance, when world business and world politics were spotlighted, emphasis was placed on the importance of trade to peace. Certainly the thousands of cargoes sent abroad have contributed heavily in this direction. It might therefore be assumed that more cargoes to more countries (or *from* more countries) would do more good. If the 3,000 ship arrivals at San Francisco during a year could be jumped to the prewar figure of 5,000, every shipyard would benefit.

There was a time when trade was created by ships. Many existing ship operations were started by ship captains developing their cargoes from port to port, and their methods have been developed into our more refined selling expeditions and cargo agencies in other lands. Many world traders overlook the opportunities for help which their shipping friends can furnish. And their banks, and consuls. Inbound cargo may be just as important to the trader as outbound, for it has not only its own merit but also the exchange for future exporting. Linking imports and exports is old, but still good.

Let's not forget that the bulwark of our export trade is the demand from highly industrialized countries; the more the world is industrialized, the bigger will be our market for goods.

It is not every industry that can call on so many factors within itself for help, but every so often a strenuous reminder is needed in order to consolidate its efforts toward one objective—in this instance more trade. Ship operators should devise ways of helping both traders and shipyards. Offshore should help intercoastal and coastwise—and there are few better sources of cross-country traffic than the trans-ocean lines. As the world becomes restored industrially and great trading volume returns—and there are many good signs—each facet of the industry will find that it has salesmen it hadn't dreamed of. And shipyards, as Strohmeier says, will be filled with ships.

Scene at Informal Banquet
Naval Architects' Spring Meeting, San Francisco

The naval architect in Chinese garb at the far left is telling J. L. Luckenbach and George Sharp that ships in the Orient are built from the keel up if specifications so provide.

The Spring Meeting of the Naval Architects and Marine Engineers

(Continued from May issue)

THE satisfaction expressed by visitors from throughout the country seems to assure a repeat of the Naval Architects' Spring Meeting at San Francisco. The technical session, the regional tours, the banquet, and the social and sports events were equally popular.

The technical papers presented by Capt. Harold J. Burke, Robert Tate and Leonard I. Schiff were published in the May *Pacific Marine Review*. Certain comments, and the banquet address of Dr. L. A. DuBridge will be found in full in this issue.

COMMITTEES FOR SAN FRANCISCO SPRING MEETING

FINANCE: William A. Baker, Chairman; Stanley M. Bebler, D. V. Reardon, George E. Swett, Morris Weitzner.

PUBLICITY: Thomas A. Short, Chairman; Richard J. Hischier, Frank S. McGuigan.

TECHNICAL SESSION: Herman Thal-Larsen, Chairman; Morris Guralnick, Robert G. Hall, Hart L. Livingston, Hughes W. Ogilvie.

HOTEL AND REGISTRATION: Charles G. Cox, Chairman; William J. Feldcamp, Merrill J. Gigy, Edward Macauley, Trescott S. White.

RECEPTION AND BANQUET: Edward J. Schneider, Chairman; Robert E. Christy, R. Peaslee DuMont, Henry F. Gelhaus, George K. Nichols, Harold G. Rethmeyer, Michael J. Ryan.

INSPECTION TRIPS AND TRANSPORTATION: Fred W. Short, Chairman; Gordon W. Colberg, Alvin C. Larsen, Ross Laurenson, John A. Mord, Jr., Harold D. Ramsden, Henry F. Sirgo, Jr.

GOLF AND DINNER: W. Edgar Martin, Chairman; John C. Clerico, Lawrence Dake, Walter B. Hill, William B. Warren, Leslie L. White.

The tours included a trip through the Radiation (Cyclotron) Laboratory of the University of California, preceded by a half-hour lecture session; a cruise on San Francisco Bay on a destroyer, through the courtesy of the Navy; and a three-hour visit to the San Francisco Naval Shipyard.

Section of head table during technical session. Left to right: Robert Tate of Matson Navigation Co. who presented epic paper on the reconversion of the S.S. "Lurline"; W. N. Landers, secretary of the Society; J. B. Woodward, Jr., president and general manager, Newport News Shipbuilding & Drydock Co., and president of the Society.

Especially notable was the entertainment at the banquet provided through the courtesy of the Moore Shipbuilding and Dry Dock Company. The performance of the Folger-Douglass duo, and the singing of Messrs. Bulotti, Sperry and Argyll with Uda Waldrop at the piano are not to be enjoyed every day—East or West.

The officers and committees did a great job.

View of part of the audience at technical session.

Reconversion of S. S. "Lurline"

—Discussion by Philip Lemler On Robert Tate's Paper—

Philip Lemler, vice president, Todd Shipyards Corp.

Editor's Note:

The epic paper on this subject presented by Robert Tate at the Spring meeting of the Society of Naval Architects and Marine Engineers in San Francisco was published in the May issue of *Pacific Marine Review* and distributed at the meeting. This "Discussion" by Philip Lemler on the collateral matter of shipbuilding in the West is deemed to be of sufficient importance to be made the feature article in this issue. Philip Lemler is vice president of Todd Shipyards Corp. in charge of San Francisco Bay Area yards.

IT IS gratifying to those of us who live on the West Coast to have received the recognition of the Society by the selection, for the first time, of a West Coast city as the site for a Spring Meeting and, nothing could be more appropriate to this San Francisco Meeting than Robert Tate's paper on the reconversion of the S. S. *Lurline*, an enterprise which was essentially a local venture.

Mr. Tate's orderly presentation of his subject accomplished fully his stated purpose of describing and recording the details of the job, pointing out as he went along the basic and extensive changes which distinguished this reconverted vessel from its original design, together with the factors and conditions which inspired and compelled these changes.

Given the opportunity, he might well have continued on into other phases of the venture—the designing, the planning, and the actual work itself. He might have pointed out that, in many respects, the problems were more complex and more difficult of rational solutions than the same problems would have been in a new ship.

In the Lurline job, one should readily envision a complete and self-supporting shipbuilding industry on the Western Seaboard—competitive at all times. This prospect, in the light of the busy Eastern yards, is now provoking considerable thought and some action.

Recently, it was pointed out that the establishment of a self-supporting shipbuilding industry on the Pacific Seaboard could follow only in the wake of a fully de-

(Please turn to page 97)

NAVAL ARCHITECTS' CONVENTION PICTURES
(opposite page)

TOP ROW.

Left to right: Capt. Philip Lemler, commenting on the "Lurline" paper of Robert Tate. Robert Tate reading his "Lurline" paper. At the table, left to right, are Secretary W. N. Landers, President John B. Woodward, Jr. and Professor Leonard I. Schiff. In the third picture is John Kooistra of Carrier Corp.

SECOND ROW.

Left to right: L. O. Arringdale and J. M. Costello. J. H. G. McConechy, former chairman of Philadelphia Section who was active in technical and section meetings. He is Chief Engineer of Sun Shipbuilding & Dry Dock Co. Irving W. Jackman of Worthington Pump; H. C. Hanson of Seattle.

THIRD ROW.

First picture (all of Johns-Manville Co.)

Left to right: T. S. Tullien, Manager, Special Industries, Pacific Region; Evan Rinehart, Manager, Marine Dept.; R. E. Foster, Industrial Salesman, Los Angeles District; John C. Lane, Industrial Salesman, San Francisco District; C. R. Huick, Industrial Salesman, Seattle District. Not shown but present at the conference: A. W. Knight, Industrial Commodity Staff Manager, Pacific Region; E. H. Clausen, Manager, Industrial Dept., San Francisco District; J. H. Goodwin.

Second picture.

Facing camera are H. L. Chatterton, Everett-Pacific; Howard Lovejoy, Puget Sound Freight Lines; Sid Smith, American Bureau of Shipping.

FOURTH ROW.

Earl Graff, U.S.A.T.; Joe M. Dyer, Astoria Marine Construction; Bill Markey, Markey Machinery; W. E. Colley, Kingsbury Machine Works; W. C. Nickum, Seattle; F. A. Hunnewell, Washington, D. C.; George Nickum, W. C. Nickum Co., Seattle; R. J. Lamont, Todds, Seattle.











JOHNS-MANVILLE LUNCHEON PRECEDING CONVENTION OF NAVAL ARCHITECTS AND MARINE ENGINEERS IN SAN FRANCISCO.

BANQUET SCENES AT CONVENTION OF NAVAL ARCHITECTS AND MARINE ENGINEERS
(Opposite Page)

Left, top to bottom:

The big center table. Clockwise from lower left: President Woodward, Mrs. Louis B. Pate, George L. Crow, J. Lewis Luckenbach, Mrs. G. L. Crow, Capt. W. N. Landers, H. C. Hanson, Mrs. H. P. Stewart, John W. Hendry, Mrs. H. C. Hanson, H. P. Stewart, Thomas B. Forster, Rear Adm. C. D. Wheelock, Mrs. W. N. Landers, Vice Adm. E. L. Cochrane, L. B. Pate, Mrs. J. Lewis Luckenbach, Dr. Lee A. DuBridge.

Second table: William C. Markey, Mrs. Louis E. Goodman, Judge Louis E. Goodman, Mrs. M. J. Ryan, M. J. Ryan, Mrs. George Swett, James S. Hines, Mrs. James S. Hines, George Swett, Mrs. Robert Spear, Robert Spear, Mrs. W. C. Markey.

Third table: Austin Sperry, Mrs. L. R. Sanford, Joseph Moore, Sr., Mrs. John W. Stewart, Charles Bulotti, Mrs. Roy Folger, John W. Stewart of Isherwood Co., Mrs. Joseph Moore, Sr., L. R. Sanford, Mrs. Austin Sperry, Roy Folger, Mrs. Charles Bulotti.

Fourth table: J. W. McDiarmid of Isthmian Line, Rolf Monsen, Robert Christie, R. M. Engelbert, A. D. Ells, Henry Gelhaus, Comdr. H. V. Barbieri, C. J. Nolan.

Right, top to bottom:

First table: Mrs. Paul Thompson; J. H. King of Babcock & Wilcox; Mrs. William Bluett; George Nichols; Mrs. J. H. King; Harry H. Smith, president of C. C. Moore & Co.; Mrs. V. W. Hoxie; George Hodges of Babcock & Wilcox.

Second table: Mrs. James R. Moore, James R. Moore, George Douglass (of China?), Mrs. Phil Coxon, Phil Coxon, Mrs. Joseph Moore, Jr., Joseph Moore, Jr., Mrs. Uda Waldrop, Uda Waldrop, Mrs. Marsden Argyll, Marsden Argyll.

Third table: T. B. Howard, Mrs. William B. Jupp, Fred Short, John Riley, Jr., J. T. Gilbride, P. F. Spaulding, Mrs. P. F. Spaulding, William B. Jupp of Socony-Vacuum.

Fourth table: B. E. Meurk of Isthmian Steamship Co., R. J. Lamont, C. R. Meurk, H. M. Silvester, Capt. Philip Lemler, Mrs. B. E. Meurk, Rear Adm. Wallace Silvester, Mrs. C. R. Meurk.

Fifth table: Paul Thompson, Mrs. George Nichols, V. W. Hoxie, Mrs. Walter B. Hill, William Bluett of Newport News, Mrs. H. H. Smith, Walter B. Hill, William Richards of Dampney Co.

LOCAL SECTION CHAIRMEN OF NAVAL ARCHITECTS AND MARINE ENGINEERS

Left to right: F. A. Hunnewell, Chesapeake Bay Section; J. T. Gilbride, So. Cal.; H. P. Stewart, No. Cal.; T. B. Forster, So. Cal.; Admiral E. L. Cochrane, New England; President of the Society John B. Woodward; J. W. Hendry, New York; Secretary of the Society, Capt. W. L. Landers; Assistant Secretary, Arlow Wilson; W. A. Warren, No. Cal.; L. M. Rakestraw; W. B. Colley; H. C. Hanson, Northwest. This is presumably the first time so many Section Chairmen have been gathered in one meeting.

Science Goes to Sea

By DR. L. A. DuBRIDGE

President, California Institute of Technology

Dr. L. A. DuBridge

I AM probably one of the greatest landlubbers to be found in the State of California. Maybe I should say I am an "air-lubber". I have crossed the Atlantic six times —but have never so much as set foot on an ocean liner. Incidentally I have also crossed the American continent at least 40 times—but have never been on a transcontinental train.

Furthermore, professionally, I am merely a physicist and have about as little knowledge of practical engineering in any field as—well, as most college presidents are supposed to have.

So I am warning you in advance that—following my air-transportation habits—I am going to sail off into the stratosphere and talk about science. In fact I am going to talk about pure science—the kind of science that is not supposed to do anybody any good. Furthermore, I am going to talk about three very abstruse topics in science—topics which would seem to be a far cry from anyone interested in sailing the high seas—namely, astronomy, electromagnetic radiation, and nuclear physics.

Why these particular topics?

Because these are three which occur to me—out of many possible choices—as examples of how studies in pure science have repercussions in the most unexpected places. And these three topics either have had or probably soon will have important influences in the area in which you are interested—the building, propulsion and navigation of ships to sail the world's seas.

I can dismiss the field of astronomy very briefly. You all know that none but the bravest and most daring seaman would have ever ventured beyond sight of shore if it were not for celestial navigation. If our planet happened to be like other of the sun's planets—perpetually covered by a dense layer of clouds which forever hid sight of the sun, moon and stars—it would be impossible to imagine what life here would be like. But certainly man would not have been sailing the seven seas in the way which he has been doing for the past four centuries.

It was research in astronomy—the careful observation of the behavior of the heavenly bodies which brought celestial navigation into being.

Incidentally it was the study of astronomy also which opened up to study the whole field of mechanics—the field which is basic to all physics and all engineering. But that is still another story.

The field of electromagnetic radiation offers an even more fascinating story—and the end of this story is not yet in sight.

Back in 1873 the brilliant British theoretical physicist, James Clerk Maxwell, published one of the greatest books in the history of science, "A Treatise on Electricity and Magnetism". This book culminated many years of work in which Maxwell brought together all the then existing knowledge in electricity and in light and developed a beautiful consistant theory which showed that light was an electromagnetic wave. He also predicted that electromagnetic waves similar to light waves, but of much longer wavelength, should be produced by oscillating electric circuits.

However, it was not until 15 years later—and 8 years after Maxwell's death—that Heinrich Hertz, in Germany, actually produced these waves which Maxwell's theory predicted. It is sometimes hard to believe that what we now call radio waves were only discovered 62 years ago. It was only 48 years ago that the first trans-Atlantic wireless signals were received and under the brilliant inventive leadership of Marconi, wireless communication became an indispensable piece of equipment for every ship at sea. Indeed, not until World War I did wireless really come into its own.

I do not need to recount to this audience what radio communication has done for the ship at sea. We simply could not imagine a modern navy or a modern merchant marine operating without it.

But we have only begun to tap the full possibilities of the use of radio waves in marine navigation. I would like to cite as examples of future possibilities just two warborn developments, radar and loran. Since I was in charge

Address presented at the banquet of Spring Meeting of the Society of Naval Architects and Marine Engineers in San Francisco, May 12, 1919.

of the Radiation Laboratory at M.I.T. during the war where loran was invented and developed and where great advances in the development of radar were achieved I may be pardoned for saying a word about the future potentialities of these two techniques.

Loran offers for the first time in the history of navigation the possibility of putting the stars out of business as the sole guide to the mariner. Already the principal sea lanes of the world are blanketed with a series of radio signals which a proper receiving set can convert almost instantly into a navigational "fix"—day or night, in clear weather of foul.

Loran makes use of the simple fact that radio waves travel always with a fixed known speed. Hence, if three suitably located synchronized transmitting stations simultaneously send out a sharp pulse signal the intervals between arrival of these signals at a ship will depend on the location of the ship, i.e. on its relative distance from the three stations. Hence by timing the interval, by electronic circuits, between the arrival of the first signal and the other two, the ship's location can be accurately determined.

Of course, the range of operation of any particular triplet of stations is limited to a radius of a few hundred or a thousand miles, so a world wide chain of stations is required. But such a chain was in operation over the North Atlantic routes long before the end of the war and coverage of important areas of the Pacific was also well along. Substantial extensions and improvements in the coverage have been achieved in recent years. It will not be long before, in any place except the more remote regions of the world, the captain of a ship or of an airplane will be able in principle to read his instantaneous latitude and longitude from the dials of a special radio receiver. I need not further emphasize the fact that a new era in air and sea navigation is now on the way. The possible ramifications of this system are such as to tickle the imagination of anyone. Fully automatic piloting on a pre-set course of either a ship or a plane is probably perfectly feasible. Some go so far as to assert that the future captain of a ship or plane will be principally an electronic technician whose main task will be to keep his complex gear in operation. With this I can not agree—for the safe operation of a ship on the high seas will always require the direction of a wise and experienced leader.

Let me turn briefly now to another application of radio waves to sea navigation—the technique known by the synthetic name of "radar". While loran is intended to supplant the stars in giving latitude and logitude, radar is designed to supplant the human eye in "seeing" surrounding objects—such as nearby land masses, neighboring ships, uncharted rocks and even approaching storms.

Radar is a "magic eye" indeed. Its principle of operation is simple. Radio pulses are sent out at short wave length in a beam that scans a desired area. The echoes which are returned by objects in the beam are displayed on a screen, which provides an accurate map of the given area.

On board a ship the radar screen presents to the pilot a map of the nearby shore line—so that in darkness or in fog he can still navigate safely near the coast, or even into the harbor. Nearby ships or other obstacles are clearly displayed and the dangers of collision in darkness or fog are enormously reduced. Eventually radar beacons can be installed at critical points on the shore or over submerged rocks to identify more clearly and more uniquely the principal points serving in the role of lighthouses or channel lights—but being as visible in foggy weather as in clear. The days when a dense fog completely paralyzes shipping in busy harbors, or in locks and canals, may be passing.

At any rate the abstruse theories of Maxwell and the crude experiments of Hertz are still bearing fruit in dozens of unexpected ways. Those who sometimes claim that university research is too impractical would do well to ponder about this story of radio waves.

A few years ago certain physicists in this country, in England, in Germany, and in France, were having their fun with another highly abstruse and apparently wholly impractical subject—the structure of the atomic nucleus.

In 1916 it is said that Lord Rutherford, while at work in his laboratory at Cambridge, England, was chided for continuing his laboratory studies instead of engaging in war work. "My laboratory experiments" he is quoted as saying, "are more important than this War". Little did he know how prophetically he spoke, for his experiments led directly 29 years later to the weapon that ended World War II.

Rutherford was the first man to break into the atomic nucleus and find out how to knock out some of its pieces. He was the first to show that the nucleus was not an indivisible, indestructible particle but was a complex array of particles, held together by enormous forces and the seat of fantastic amounts of energy.

Following Rutherford's work in 1916 more and more physicists plunged into this fascinating new line of work. By 1937 many an industrial engineer was complaining with despair that the physicists had deserted the real world of machines and materials and had soared off into the stratosphere of the nucleus, quantum theory and relativity.

That stratosphere came down to the earth with a bang on the day of Hiroshima. Again the impractical visionary work of the science laboratory rocked the world in a way which all the purely practical work of the engineer could never have done. No amount of work by the ordnance expert on improving explosives could ever have produced the atomic bomb.

Now—did the physicists know all the time during those previous 30 years that they would some day produce an atomic bomb? Certainly not! They were extending the bounds of knowledge and they could not have foretold where the new knowledge would lead. In fact it was not until 1939 that the critical discovery of atomic fission was made and not until that discovery was a nuclear explosion even thinkable.

And what does nuclear fission have to do with marine engineering? Frankly we do not yet know. It is as difficult to predict as it would have been difficult to predict the effects of radio waves back in 1900. But we can make a good guess that eventually there will be some impact. What effects the atomic bomb may have on the future navies of the world I will leave to you to guess.

But nuclear energy can be used in a controllable manner as well as in a bomb. Will nuclear power plants

Attended Naval Architects' Spring Meeting

Left: Julian Arntz, Assistant Manager, Bethlehem Steel Co., Shipbuilding Division, San Francisco.

Below: Sewell A. Knapp, general superintendent, Moore Dry Dock Co.

Capt. Edward Macauley, Manufacturers' Representative and Consultant, former member of the Maritime Commission.

eventually propel our ships?

It is too early to be sure, but there are some interesting possibilities. We do know that when one pound of Uranium is fully consumed by fission in a nuclear furnace the amount of heat produced is equal to that produced by burning 3 million pounds of coal or oil. It would be pretty handy, wouldn't it, if a large ship could dispense with the necessity of starting out on a voyage with 1000 tons of oil in its tanks and carry instead about 2/3 of a *pound* of Uranium. The captain might even smuggle aboard 10 pounds in his suitcase and have enough fuel for 6 months of steady steaming.

Or—wouldn't a submarine captain love to have a fuel which burned without using oxygen, which gave off no suffocating fumes or smoke—and where he could start out with enough fuel aboard to let him cruise under water continuously for a year—as if anybody should want to!

Yes, it's pretty fantastic. There must be a joker in it somewhere.

As a matter of fact there is a joker—in fact there are several. But in *principle* these things are possible. The jokers have to do with some engineering difficulties. These will no doubt be licked in time—but not right away.

There are in fact nuclear furnaces now at work. They do produce *heat* energy at the calculated rate. But none, as yet, produces any appreciable *mechanical* energy—the kind of energy it takes to push a ship. You can have a self-heated hot water bottle aboard a ship until the cows come home—but it won't move the ship an inch. To get mechanical energy you must have *steam*—or something equally hot. And the nuclear furnaces so far built won't run that hot. They weren't built for that purpose. And to build a *hot* furnace turns out to be quite a job. It's being worked on—hard. But is will be many years before one is actually working. I'll not try to explain all the engineering problems, except to say that new materials will have to be found which will not only withstand high temperatures but which have the right nuclear properties so it won't quench the nuclear reactions. Steel, for example, absorbs too many neutrons—and neutrons are what keep the nuclear fires going. So steel is out! What then shall we use? That remains to be found out.

These neutrons in fact give rise to another difficulty. They must be present in great quantities inside the furnace to keep the fission going. But they mustn't get out—for they would kill everyone around. They are more lethal than X-rays—and are present in an intensity equal to a million X-ray tubes.

And they are more difficult to confine than X-rays. You don't shut them up in the furnace just by closing a door. It takes several feet of concrete—or an equal *weight* of lead to stop them. So every nuclear furnace must be completely surrounded by a very thick and heavy shield.

Furthermore, the danger doesn't pass when you shut the furnace off—for the operation of the furnace makes everything inside it intensely radioactive. It's like having a few *tons* of radium aboard. You can't even open up the furnace to make repairs. When something goes wrong you'll just have to throw the furnace away and get a new one. And since a furnace big enough to run a ship would probably cost a few million dollars, this is no joke.

And what about costs? Because it takes so little Uranium to equal a lot of coal, people think it will be cheap. But raw Uranium oxide costs several dollars a pound. By the time the highly purified metal is prepared the cost is probably at least $25.00 a pound. But the fissionable Uranium—the Uranium that works as a fuel—is only the light isotope—Uranium 235—which is present to only 1 part in 140 in natural Uranium. Uranium 235 is worth $3500 a pound, i.e. $7,000,000 per

ton. True, a pound will last a long time—but the nuclear furnace won't go at all unless there is quite a lot of Uranium present in the first place—say a few hundred pounds in a high-power furnace. Then with all the other scarce and expensive and highly purified materials that need to go in the furnace the cost gets pretty high. Engineering advances will eventually bring the costs down, of course—but it will take a long time to get them down to where Uranium power is as cheap as power from coal or oil. The initial cost of the furnace is bound to be very high.

But even so the nuclear power plant is certainly on the way—provided the prospectors locate enough Uranium! Uranium is a terribly scarce material. At least workable deposits are scarce. There is plenty to run quite a few ships, of course, but not enough to supply America's need for industrial power too. We'll hope that lots more will be discovered by the time the engineers have solved their problems and nuclear power plants become a practical reality as some day they surely will.

* * *

Well, I hope these remarks I have made will illustrate the point I wish to make—namely, even the field of marine engineering—like every other phase of modern industry and modern life—owes quite a lot to the scientist in the laboratory. What he does in his laboratory today may not change the world for many years. But all the great changes which will come—which are coming and which have come—we owe to him. This scientist is usually a quiet fellow—and he has to be pretty high up in his profession to be making $10,000 a year. And he is lucky if he can get hold of a few thousand a year for the apparatus he needs. Considering the fact that he is the one who is changing the world it seems rather sad that we don't pay him more and provide him with all the equipment he can use. Our government for example spends hundreds of millions of dollars a year on applied research—on putting to practical use the knowledge which the scientists have undercovered. You would think it might be a good idea to put at least one tenth of that into basic research—the task of uncovering *new* knowledge. But mostly this task is left to the universities to find the money as best they can. One office of the government has stepped in to help a little—the Office of Naval Research. For this I pay sincere tribute to the many Navy representatives here. Again naval problems and the problems of science have found a point of contact. But the ONR budget is inadequate and is being further cut.

For four years there has been before Congress a Science Foundation Bill. It hasn't yet passed. It did pass the Senate at this session, but is still bottled up in the House. That Bill should be passed at once and a Science Foundation with an annual budget of 50 million dollars to start with should swing into action soon. And even then, private individuals and corporations will need to dig deeper in support of our universities. For their programs of education and research—in physical science, in biology, and medicine, in social science, in all fields, are vital to the future welfare of our country. The universities provide our future leaders and our future knowledge. On what else does our future depend?

At Architects' Session

Capt. (Admiral - designate) Hugh E. Haven, USN, Commandant, Mare Island Naval Shipyard.

Lloyd C. Fleming, Pacific Coast Director, U. S. Maritime Commission.

Henry Gelhaus, Pacific Coast Sales Manager, Todd Shipyards Corp.

Fighting Fire at Sea

(Continued from May issue)

By CAPT. HAROLD J. BURKE, U.S.N.R.*

Maintenance

Maintenance of fire-fighting equipment in every detail is of utmost importance. Absence of proper maintenance is equivalent to no protection. Every ship should have a check-off list covering the fire-protection and prevention features of a vessel in detail and it should be the specific duty of a responsible officer of the ship to go over the equipment and see that the check-off has been followed properly and that all points requiring attention have received it. This inspection should go right from the fire pumps to the fire main system, to the hose valves, hose, fire-equipment lockers, and to all built-in fire-detecting, fire alarm or fire-extinguishing systems.

Proper maintenance of fire-fighting equipment afloat is more necessary than maintenance of equipment ashore, because in the latter case renewals or replacements are relatively easy to obtain. Afloat we can go no further than the hull we are in.

Fire Parties

Every ship should have a comprehensive yet easily operable fire bill. This should show the duty of various members of the crew in the event of fire and should furnish a guide to govern them in their actions. Each fire party should be composed of sufficient personnel to handle the equipment that will be found in the fire lockers and the size of each fire party must be in relation to the size of the crew. Where the personnel situation permits, a separate fire party should be assigned to each fire-equipment locker and each of these fire parties should be under the command of a shop's officer. Immediately upon reporting to the fire locker, members of the fire party should don the breathing apparatus previously referred to, the boots and helmets which are items of personal equipage, and should take from the locker to the scene of the fire those items of fire-fighting gear which have been established in conformity with the fire bill.

It is suggested that only one fire party proceed to the fire initially and that other fire parties assume a position of readiness, completely equipped at each of the other fire-equipment lockers, ready to move in to reinforce the first party or to attack the fire from an entirely different angle if so directed. It is very important to realize that a ship must consider the possibility of successive simultaneous fires or of the first fire gaining such proportions that its extension is likely unless additional fire-fighting measures are taken.

Training

While the foregoing discussion in respect to fire parties probably will focus some attention on the problem and give some indication of the proper procedure aboard a ship afire at sea, there is nothing that can take the place of training. One of the paramount considerations of successful fire fighting is to instill in personnel confidence in their fire-fighting equipment and confidence in their ability to use that equipment successfully. This is a basic function of training. Americans are basically intelligent people. They learn with amazing rapidity and when a problem is presented to them in the proper light and with the proper training aids or demonstrations they grasp the point completely.

During the recent war the United States Navy was confronted with a tremendous task. It was the necessity for training over two million men in fire fighting. This was necessary because, starting with Pearl Harbor, fire became one of the major offensive weapons of the war. The training program was complicated further by the fact that the majority of the trainees had had no previous naval experience. To cope with this problem, ship mock-ups were built ashore. The mock-ups were of reinforced concrete lined with brick so as to present the highest degree of fire resistance, while the interior was arranged with floor plates, ladders, decks, walkways, railings, pipings, etc., quite accurately reproducing the interior of a ship. Each of these mock-ups consisted of three sections. The first was the forecastle section, the second the fire-room section, and the third the engine-room section. These sections were arranged so that they could be loaded with combustible material and ignited.

To simulate fires in the machinery spaces. Diesel oil was pumped into the bilges and ignited. The fires that resulted were often much more serious than those that would have been experienced afloat and students with equipment similar to that recommended previously in this paper were required to attack the fire under the leadership of an instructor who was recruited from one of our municipal fire departments and given special indoctrination and teacher's training to qualify him as an instructor. It was amazing to observe the effectiveness of this program. The fear of fire was taken out of the minds of naval personnel. They acquired confidence in their ability to use the equipment successfully. As a result, when ships took fire, the crews stood and fought the fire.

Five of these Navy schools still exist on the West Coast and four on the East Coast. Each one is near some deep water harbor and it may be possible to effect some arrangement whereby the crews of our merchant ships

*Capt Burke, who is associated with the C-O-Two Fire Equipment Co., Newark, N. J., prepared this paper for presentation before the Spring meeting of the Society of Naval Architects and Marine Engineers, San Francisco.

could receive fire-fighting instruction. The United States Navy is permitting officers and men of the merchant service to attend the course in fire fighting at Damage Control Training Center, United States Naval Shipyard, Philadelphia, Pa. If an endorsement of attendance at a fighter school were a prerequisite to the issuance of various licenses by the Coast Guard, it might be possible eventually to secure proper training.

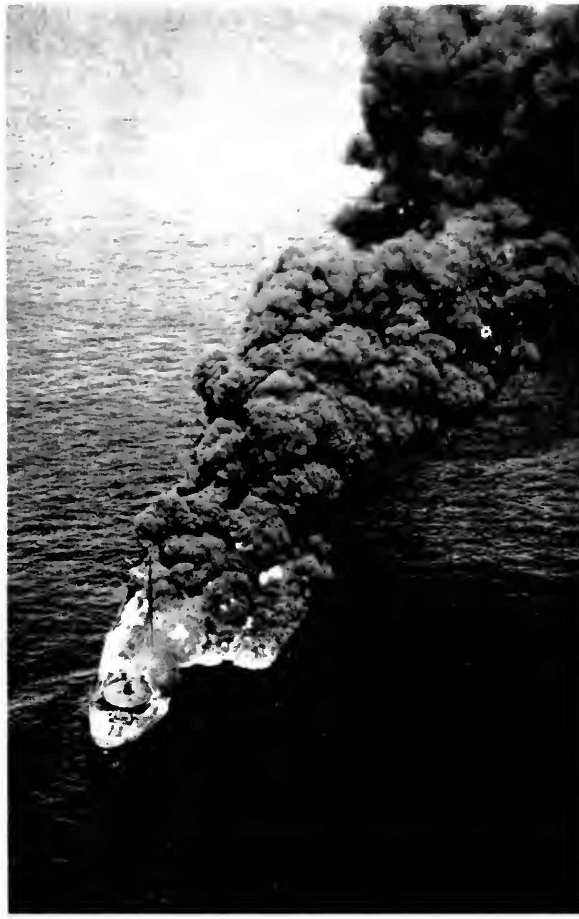
Actually, the successful handling of a fire stems from good training, discipline, and an elementary knowledge of the chemistry of fire.

Classification of Fires

It is said sometimes that "no two fires are alike" and the statement is true with regard to circumstances such as the range and intensity of the fire, and the nature and influence of the attending physical conditions. The combustibles involved are not always of one general kind. However, many fires are consistently alike, so much so that a threefold classification has come to be accepted quite universally. The basis for the classification, with respect to two groups, is combustion characteristics, and, with respect to the third, the characteristic hazard presented. These characteristics determine the method of extinguishment for each group of fires; that is, for Class A, Class B, and Class C fires.

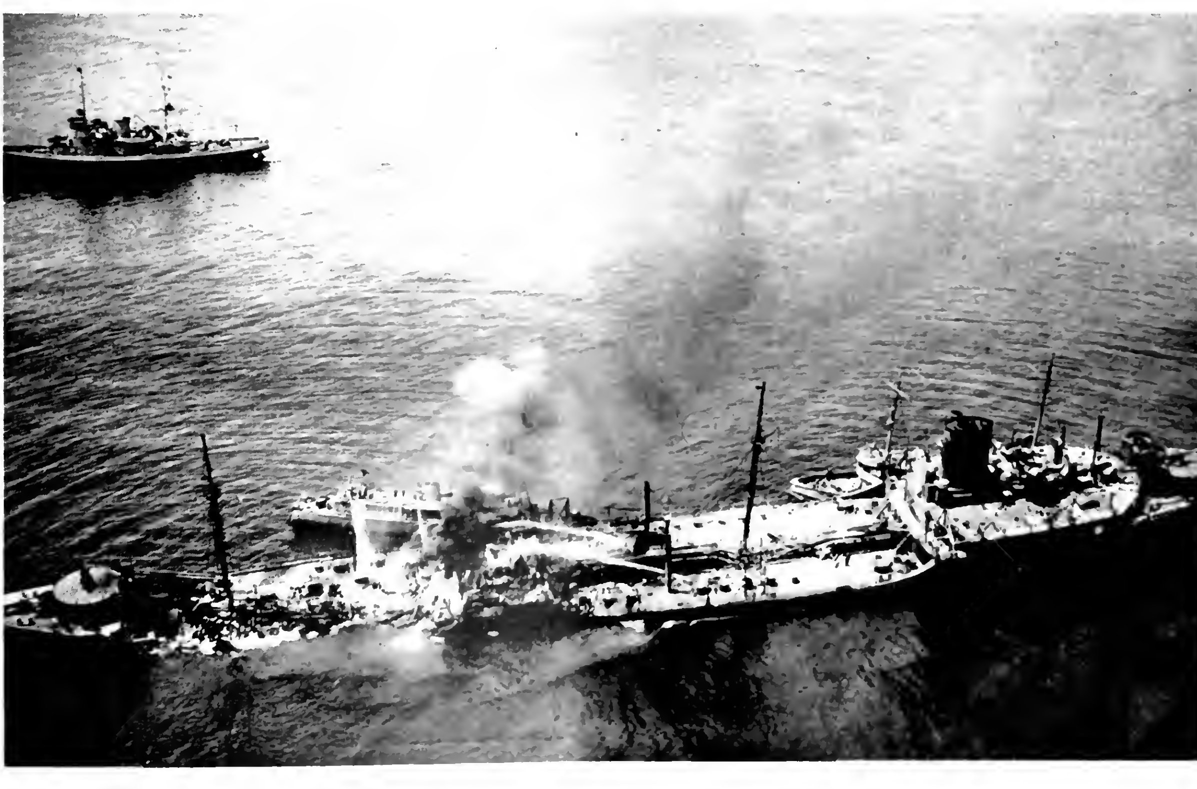
Class A fires are fires in ordinary combustible or car-

(Please turn to page 102)



Opposite: Actual war photograph of torpedoed tanker off Virginia Capes. Note ruptured cargo tanks and flaming gasoline on port side.

Below: Same vessel after combat fire fighters attacked fire. The salvage of cargo and vessel was approximately 70%.



The Prototype Cargo Vessel

The Maritime Commission has announced plans for two prototype vessels, which plans are to be submitted to commercial operators as replacements for their present operating fleets, with such changes as they may require for their particular services. Reference is here made to the editorial comment on Page 39 of the May *Pacific Marine Review* in which it is pointed out that 1600 ships will require replacement during the next dozen years or so and that no doubt a start will be made with Libertys and Victorys of which there are 190 in the privately owned fleets in addition to about 90 percent of the steamers in the layup fleets, at present numbering 1,846 ships.

A brief comparison of present leading vessel types with the first of the two prototypes is as follows:

	Prototype	Liberty	Victory	C-3	P-2
Length overall	477′ 6″	441′ 7½″	455′ 3″	492′	608′ 11″
Beam	66′	56′ 10¾″	62′	69′ 6″	75′ 6″
Draft load waterline	28′ 6″	27′ 7″	28′ 6″	29′ 6″	29′
Net tonnage	5,300	4380	4555	5700	
Shaft horsepower	12,500	2500	8500	8500	18,000
Deadweight	10,500	10,800	10,850	12,929	12,063

The type number of the first prototype is C-3-S-DX1. The second vessel, a cargo passenger type, will be designated S-X-D-Y. It will be 528 feet long with 20,000 shaft horsepower. Inboard profile and deck and arrangement plans are on the folded insert.

General Description

THE vessel features a curved raked stem and cruiser stern, with two complete decks, namely; main and second decks fitted all fore and aft. A third deck, below the second deck is fitted forward of the machinery space. Aft of the machinery space the third deck is formed by a flat carried across the vessel at the level of the tunnel top.

The ship will be built as a full scantling type with minimum freeboard to the Main Deck. In order to facilitate ready conversion to shelter deck type, there will be incorporated the necessary structure for later installation of tonnage hatch and well and tonnage openings. Further to this purpose, nine inch hatch coamings will be fitted in way of all Second Deck hatch openings, and the arrangement of Second Deck will not impede required access to tonnage openings.

The vessel will be constructed of steel on a transverse system of framing. Shell butts and seams will be welded throughout except that the shell seam at the upper turn of the bilge will be riveted for at least the midship half length. Connection of sheer strake to main deck stringer will be riveted gunwale angle. Main deck will have a riveted seam strap outboard of hatch sides port and starboard. In general, all other connections will be welded.

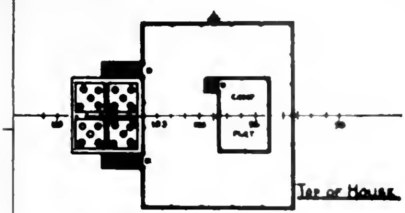
Hatches will have corner pillars with hatch girders and deck girders designed to suit this arrangement of deck supports.

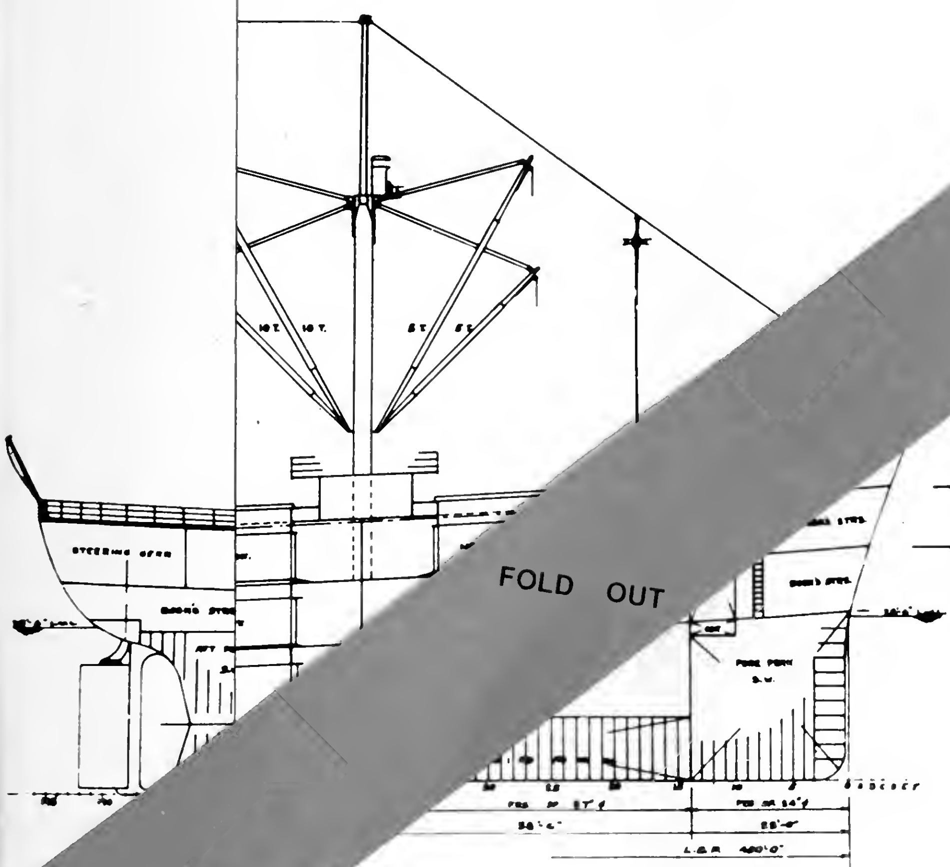
Decks in the superstructure will generally be supported by a system of pillars and girders. Ordinary partition bulkheads of the joiner type will contribute no support to decks over. However, where steel bulkheads are required to resist racking, or for house envelope, or firezoning, they will be used as deck supports to replace pillars and girders when possible.

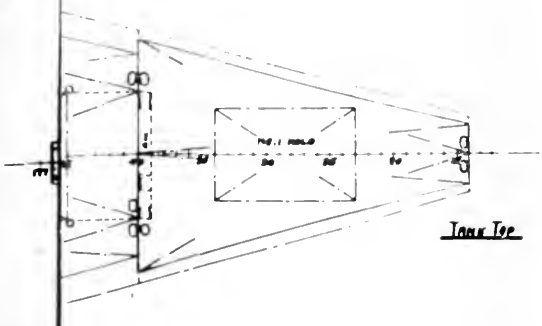
Foundations will be of welded construction through-

Details of the first vessel now being offered builders follows:

General Characteristics	
Length Overall	477′-6″
Length Between Perpendiculars	450′-0″
Beam, molded	66′-0″
Depth to weather deck	41′-6″
Sheer, forward	9′-2″
Sheer, aft	4′-7″
Straight Chamber, weather deck	1′-0″
Heights, deck houses except wheelhouse	9′-0″
Height, wheelhouse	8′-0″
Height, 2nd to weather deck at side	10′-0″
Height, 3rd to 2nd deck	11′-0″
Height, B. L. to T. T.	4′-6″
Draft, Design Load Waterline	28′-6″
Draft, Scantling	31′-3″
No. of Transverse W.T. Bhds.	7
Gross Tonnage (approx.)	8800
Net Tonnage (approx.)	5300
Complement:	
Officers and Crew	52
Deck	21
Engine Room	19
Steward	12
Passengers	12
Life Boat Capacity (Total)	132
Cargo (cubic feet bale) approx.	553,400
Tank Capacity (approx.):	
Fuel Oil, Normal	2220 tons
Fresh Water	150 tons
Machinery:	
Type	Geared Turbine
Pressure and Temperature	850 lbs. sq. in/890°F.
No. of Screws	One
SHP, Normal	12500
Speed, Sustained 27′ Draft	18.5 Knots
Evaporator Capacity	2-8000 G.P.D.
Generating Plant Capacity	3-300 KW
Total Deadweight (28′-6″ draft)	10500
Lightship (approx.)	5400 tons
Total Displacement (28′-6″ draft)	15900 tons







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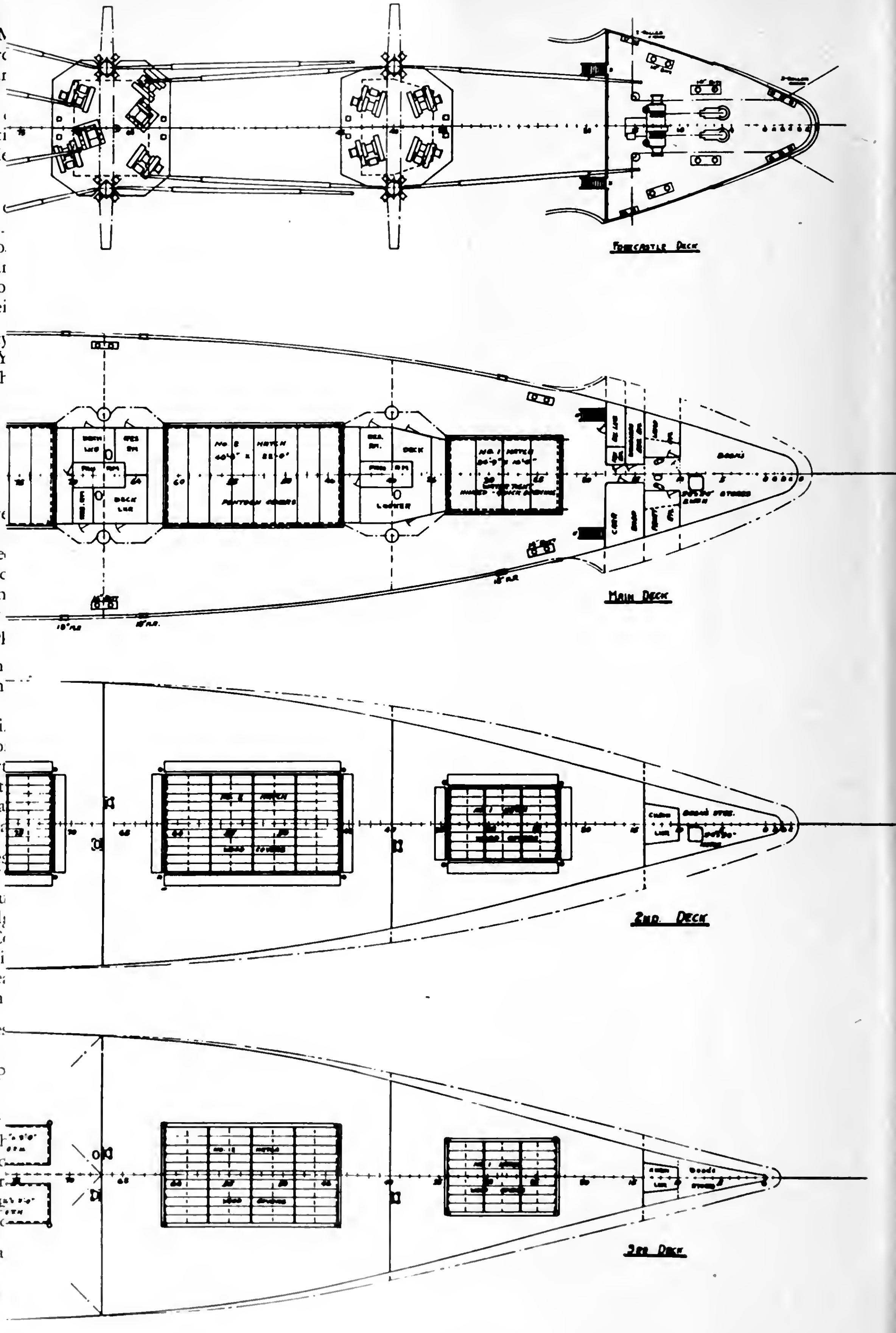

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Five cargo holds are provided, three forward of the machinery spaces and two aft.

Clear hatch openings 40′ x 22′ in the decks of holds numbers 2, 3, and 4, are dimensioned primarily with the view to wartime service requirements. Hold numbers 1 and 5 will have clear hatch openings of 24′-9″ x 16″-0″ and 35′ x 22′ respectively. Notwithstanding these long hatches, seven main transverse watertight bulkheads have been spaced throughout the vessel's length to provide a subdivision standard such that any one compartment may be opened to the sea without the probability of the loss of the vessel.

Overhead loading has been provided for each hold. The spacing of transverse bulkheads is such that with the double ganging of numbers 2, 3, and 4 holds, approximately equal amounts of cargo cubic are distributed under each set of cargo handling gear. A table of capacities appears below.

DRY CARGO

No. 1 Hold	Bale Cubic	52,800
No. 2 Hold	Bale Cubic	125,400
No. 3 Hold	Bale Cubic	149,200
No. 4 Hold	Bale Cubic	144,400
No. 5 Hold	Bale Cubic	81,600
Total		553,400

SALT WATER BALLAST TANKS

Forepeak Tank	Tons @ 35 cu. ft/ton	114
No. 1 Deep Tank P & S	Tons @ 35 cu. ft/ton	966
No. 2 Deep Tank P & S	Tons @ 35 cu. ft/ton	1195
Afterpeak Tank	Tons @ 35 cu. ft/ton	60
Total		2335

FUEL OIL

No. 1 Dbl. Bot.	P & S	Tons @ 37.23 cu. ft/ton	311
No. 2 Dbl. Bot.	P & S	Tons @ 37.23 cu. ft/ton	148
No. 2 Dbl. Bot.	C. L.	Tons @ 37.23 cu. ft/ton	167
No. 3 Dbl. Bot.	P & S	Tons @ 37.23 cu. ft/ton	271
No. 3 Dbl. Bot.	C. L.	Tons @ 37.23 cu. ft/ton	141
No. 4 Dbl. Bot.	P & S	Tons @ 38.23 cu. ft/ton	228
No. 4 Dbl. Bot.	C. L.	Tons @ 37.23 cu. ft/ton	42
No. 5 Dbl. Bot.	P & S	Tons @ 37.23 cu. ft/ton	189
No. 5 Dbl. Bot.	C. L.	Tons @ 37.23 cu. ft/ton	195
No. 3 Deep	P & S	Tons @ 37.23 cu. ft/ton	128
No 4 Deep	P & S	Tons @ 37.23 cu. ft/ton	288
Settlers	P & S	Tons @ 37.23 cu. ft/ton	113
Total			2221

Note: The above capacities are subject to some variation if alternate lines are adopted.

Booms of tubular or tapered steel construction of 5 and 10 ton capacities will be mounted on the base of the kingposts. The length of the booms will be such that when topped to an angle of 45 degrees, they will have an outreach over the side of the ship of 18 feet.

A tubular steel mast to support radar gear will be located on top of pilot house.

Topmasts will be provided on centerline of truss girders between kingposts at frames 40 and 122.

Steel kingposts without rake will be cross-connected at the top by truss type girders with steel cantilever outriggers, extending outboard of each kingpost in line with inboard girders. Girders and outriggers will provide support for gear required to suit vang and topping lift riggings.

All five and ten ton booms will be rigged in such a manner that each unloaded boom can be positioned and fixed by means of power over any point within the range of the boom. Thirty-two electric motor driven topping winches are provided for this purpose.

Five and ten ton booms will be stowed horizontally. One 50 ton boom stowed vertically will be mounted on a pedestal on centerline of ship at the after end of number 2 hold.

Weather deck hatch covers will be steel pontoon type with the exception of an experimental installation of a watertight quick opening cover on No. 1 hatch. Tween deck covers will be wood supported by built up steel beams.

Deck and mooring fittings will be of welded construction wherever feasible.

The tank top plating will be increased in thickness to compensate for elimination of wood ceilings. Sparring will be nominal 2″ x 6″ Douglas Fir as required by A. B. S.

The cargo winches will be of the single drum, double reduction gear, D. C. electric motor driven type with motor and electric brake mounted on the winch bedplate and controls and resistors arranged for mounting in deck houses. The first reduction gears will have cut herringbone teeth and the second reduction gears will have cut spur teeth.

There will be provided one motor driven combined windlass and warping winch of the horizontal type designed for anchor handling and warping.

There will be provided two electric motor driven reversible vertical capstans located in the after deck with the driving machinery located below deck.

Deep tanks for clean salt water ballast or dry cargo are fitted over the entire length and breadth of number three hold extending from the tank top to the third deck. This installation will eliminate delay and expense of procuring, stowing, and removing fixed ballast on return voyages without cargo. It will be suitable for possible adaptation to carry C. O. if so desired by operators.

In accordance with the Commission's past practice in constructing standard cargo vessels, it is contemplated that changes in detail or arrangement will be accomplished to suit special requirements of individual operators purchasing ships to this basic design.

The main propelling machinery will consist of a cross compound, double-reduction, geared turbine of the latest marine design, driving a single propeller through a line of shafting at about 90 revolutions per minute and delivering 12500 shaft horsepower at the propeller. It will be capable of continuous operation at 10 per cent overload. Steam will be generated by two water tube boilers and delivered at the throttle at 850 psi gage pressure and 890 degrees fahrenheit total temperature. Boilers will be fitted for burning fuel oil under forced draft. A cruising radius of about 14000 nautical miles is to be obtained with this machinery operating at 12500 shaft horsepower.

In general, the auxiliaries are motor driven, deriving their power from a turbine generating plant consisting

(Please turn to page 93)

Editor's Note:

This is the first of a series of articles on pioneering ships and men in Pacific shipping operations. This year is the 100th anniversary of Capt. Matson's birth, and the series is starting with Matson operations. We have suggestions for additional articles of this type and will be glad to have additional suggestions from our readers who remember those who built the shipping industry on the Pacific and whom they would like commemorated in this manner. It is expected that the series will be well worth preserving.

The Matson Lines

THE discovery of gold in California one hundred years ago can probably be credited with being the most important factor in the founding of the city of San Francisco. Since the discovery of gold, undoubtedly an important influence in the economy of the city of San Francisco and the Bay Area has been its land locked harbor and port. The commerce which flowed through the Golden Gate in the last one hundred years has been the backbone of the growth of San Francisco and the Bay Area and will continue to provide a large proportion of the industry necessary for the continued development of this city.

Capt. William Matson
Founder of Matson Lines

The history of the port is synonymous with the history of the steamship companies, who reached out with their ships from San Francisco to all parts of the world, carrying the exports and imports which mean much to the economy of San Francisco. One of the steamship companies, whose home port has always been, and still is San Francisco, and which has contributed its share to the development of the port for over half a century is the Matson Navigation Co.

Captain William Matson, founder of the Matson Lines, was born in Lysekil, Sweden, October 18, 1849, the year that saw the start of the Gold Rush in California. He arrived in California at the age of eighteen and brought the two ingredients of a great career together—an epochal opportunity which was to unfold during the following years, and the ability to grasp his opportunity and develop it.

His parents were both accidentally killed when he was a young child. He shipped as a "handy boy" when barely ten years of age and his formal education was fostered between voyages until the age of fourteen. Ships traveling to distant places were his main interest. The *Aurora,* a Nova Scotia vessel brought him to New York, and from there he joined the throng on the long voyage around the Horn on the *Bridgewater* to San Francisco.

Captain Matson's field of endeavor was destined to lie between the port of San Francisco and the Hawaiian Islands. Situated some two thousand miles from the Mainland, Hawaii is dependent for its livelihood upon the sale in the continental United States of its two principal products—sugar and pineapple. These can not be sold elsewhere, for Hawaii is an integral part of the United States, and within its tariff boundary. It can not economically raise its own food or manufacture the necessities of its own existence and must therefore bring them in from the continental United States in exchange for its sugar and pineapple.

The total exports to the Mainland from Hawaii have increased from $28,000,000 in 1901 to $102,000,000 in 1940. In the same period, imports from the Mainland have grown from $11,000,000 to $127,000,000.

The third industry in importance to Hawaii is the tourist industry—tourists from the Mainland—dependent entirely on adequate transportation. It is expected that this industry may sometime in the near future surpass the two basic industries of sugar and pineapple.

Hawaii has always been wholly dependent on transportation by sea and by air, but the preponderant proportion of that transportation is now, and without doubt will continue to be in the future, dependent on surface vessels.

For almost seventy years the principal transportation link between the Hawaiian Islands and the Mainland United States has been the service rendered by the Matson Navigation Company from its home port, San Francisco. The Territory is classed among the top five leading communities of the world in the superiority of its living conditions. It has grown steadily in population; as of July 1, 1948 there were 528,467 persons living on its several islands. To the development of Hawaii

through the port of San Francisco and to the establishment of the high standard of living, efficient transportation has contributed in a great degree. Throughout the entire period of development, the names of San Francisco, Hawaii, and Matson have been inextricably associated in many respects, for their growth and progress have been together, each complementing the other.

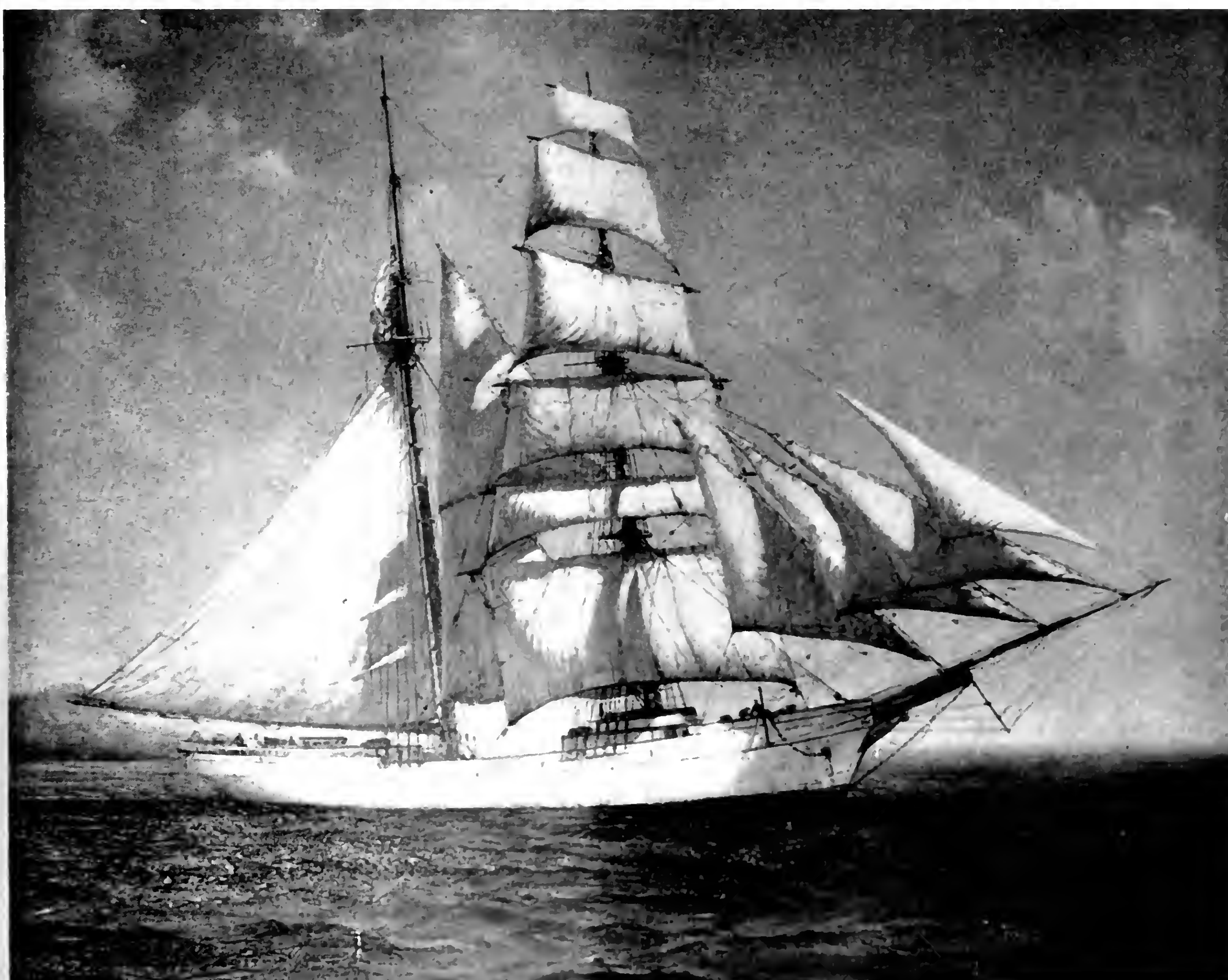
In 1876, the Treaty of Reciprocity between the United States and the Kingdom of Hawaii was signed. At that time the population of Hawaii was a little more than 50,000 and sugar production was about 12,000 tons per year, but its export was barred by a high tariff. The Treaty of Reciprocity admitted Hawaiian sugar free of duty, and transportation of the Island products to the Mainland became a necessity. Captain Matson purchased a ship for the Hawaiian trade to furnish the sugar plantations with regular service. His first vessel was the schooner *Emma Claudina*, with 300 tons capacity. Captain Matson arrived at Hilo Harbor on May 4, 1882 and began the service between the plantations and the refinery in San Francisco.

From a sparsely settled almost primitive community, whose isolation was a dominant factor in its economy and culture, Hawaii has developed during the intervening years into one of the world's most modern and progressive insular areas. The steps by which Matson transportation service evolved, provides a record of constant progress for Hawaii and San Francisco and the transportation system which links the two places together.

Additional ships were added for the sugar trade, carrying general merchandise from San Francisco to Hawaii and returning with sugar, hides, coconuts, and some tropical fruits, but the main cargoes were sugar. The *Salinas, Julia Ford,* and the *North* were chartered for the sugar trade after the purchase of the *Emma Claudia*, and in 1887 the brigantine *Lurline*, 135 feet long, 640 tons capacity, with accommodations for four passengers, began her career.

As the trade expanded, additional vessels were purchased: the *Harvester* in 1891, the *Santiago, Roderick*

THE BRIGANTINE "LURLINE"



William P. Roth, Chairman of the Board of Matson.

Dhu, and by 1900 such ships as the *Falls of Clyde, Monterey, Marion Chilcott, Selina, J. M. Weatherwax, Antelope,* and *Annie Johnson.*

By the turn of the century, Hawaii's population had risen to 154,000, her sugar production had grown from 12,540 tons in 1875 to 289,544 tons in 1900. Imports and exports were valued at more than $40,000,000 yearly.

First in Oil

Matson Navigation Company was incorporated February 9, 1901. During the half-dozen years following, steam steadily gained in ocean transportation and the slower sailing vessels began to disappear. Matson Navigation Company didn't make the switch from sail to steam by operating coal burners with their high bunker costs, but were the first to take advantage of the oil in the California fields and started burning oil instead of coal. Captain Matson with a group of associates built a forty-five mile pipeline from the Santa Maria fields to Gaviota where the oil was transferred to ships.

In September, 1901, Matson Navigation Company purchased the steamer *Enterprise* and converted her to an oil burner. This ship was a combination passenger and freight vessel, 2806 gross tons, with a capacity of 160,050 cubic feet of dry cargo space, 866 cubic feet of refrigerated cargo space, accommodations for twenty-two passengers and a speed of ten knots. She went into service in March, 1902 and was kept on the run until November, 1926. The *Enterprise* was the first commercial offshore oil burner in the Pacific. With the availability of oil, many of the Hawaii sugar planters changed their irrigation pumps and sugar mill machinery from coal to oil, and Matson Lines started to carry oil in bulk to Hawaii. Consequently the *Santiago, Roderick Dhu,*

The "Hawaiian Planter," one of Matson's modern C-3 fleet.

Falls of Clyde, Marion Chilcott, and the old *Monterey* were converted into tankers to carry the oil. In addition these ships delivered oil to Portland, Seattle, and as far north as Nome, Alaska.

The *Hilonian,* a 340 foot steamer, 2921 gross tons, followed the *Enterprise* into the Matson fleet. She was rebuilt to carry forty pasengers in addition to dry and refrigerated cargo, and was the first ship in the Pacific to install wireless to communicate from ship to shore.

The *Hilonian* sailed from New York with a cargo of general merchandise and arrived in San Francisco at the time of the fire. Her cargo was taken over by the army and distributed to the people of San Francisco.

Prior to 1907, the port of Hilo on the Island of Hawaii was the main terminal port of the Islands, but in the late spring of that year the *Hilonian* steamed out of San Francisco with the sailing ship *Falls of Clyde* in tow. She arrived at Hilo, left the *Clyde,* and proceeded to Honolulu arriving there July 9, 1907 to inaugurate Matson's service to the port which thereafter was to be the main terminus and shipping center for all steamers calling in the Islands.

In January, 1908, negotiations were completed consolidating the service of the Planters Line with the Matson Navigation Company. Ten ships were transferred to Matson under this agreement. The newest was the schooner *W. H. Marston* built in 1901, and the oldest was the bark *Mohican* built in 1875. All these ships were added to the fleet as of February 1, 1908 and together with the Matson sailing vessels were gradually retired or sold as newer and faster steamers took their place.

Commerce from San Francisco to Hawaii, and return,

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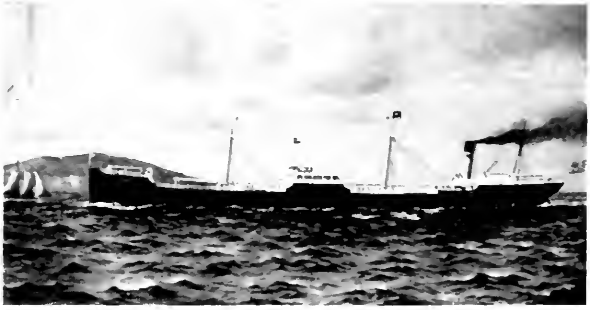
John E. Cushing, President of Matson

Top: "Lurline II," built in 1908.

Center: S.S. "Enterprise," the first off-shore oil burner in the Pacific.

Bottom: "Maui," photographed entering Honolulu Harbor, about 1918. She was built in 1915 at Union Iron Works, San Francisco.



was growing. Hawaii's population passed the 185,000 mark. Sugar production was over 500,000 tons annually and more than 400,000 cases of pineapple were being shipped every year. Tourists began to visit Hawaii in increasing numbers. The second *Lurline* was built in 1908. She was 412 feet long and had accommodations for eighty-four passengers and 899 tons of cargo. Her speed was twelve knots. She sailed on her maiden voyage June 6, 1908 and was finally retired on October 19, 1928. The operation of the second *Lurline* was immediately successful and the growth of the Island trade prompted the building of newer and faster vessels.

1908 saw Matson the largest government freight carrier between San Francisco and Honolulu and by 1910 the second ship built exclusively for the Hawaii trade, the SS *Wilhelmina,* sailed on her maiden voyage February 10. She was the forerunner of the Pacific luxury liners to be built in the following years. She had a speed of thirteen knots, was 426 feet long, and carried 150 passengers, in addition to dry and refrigerated cargo.

Molasses, a by-product of the sugar industry, was becoming increasingly in demand on the Mainland. In 1911 the *Hyades* and the *Hilonian* had tanks installed to carry oil outbound and molasses returning. Plans were drawn for additional ships designed to meet the specifications for the Hawaii trade, and the *Matsonia* and the *Manoa* were completed in 1914. The *Matsonia* was 480 feet long, gross tonnage 9492 with a speed of fifteen knots. She carried 242 pasengers. The *Manoa* was 422 feet long, 6805 gross tons, speed thirteen knots and accommodated ninety passengers. The following year, 1915, a sister ship of the *Matsonia* was ordered, the SS *Maui.* She was built at the Union Iron Works, (now Bethlehem), San Francisco, and was delivered in 1917 and was at that time the largest and most expensive merchant ship ever built on the Pacific Coast. She was the first ship to cross the Pacific with a gyro compass and left San Francisco on her maiden voyage one day after

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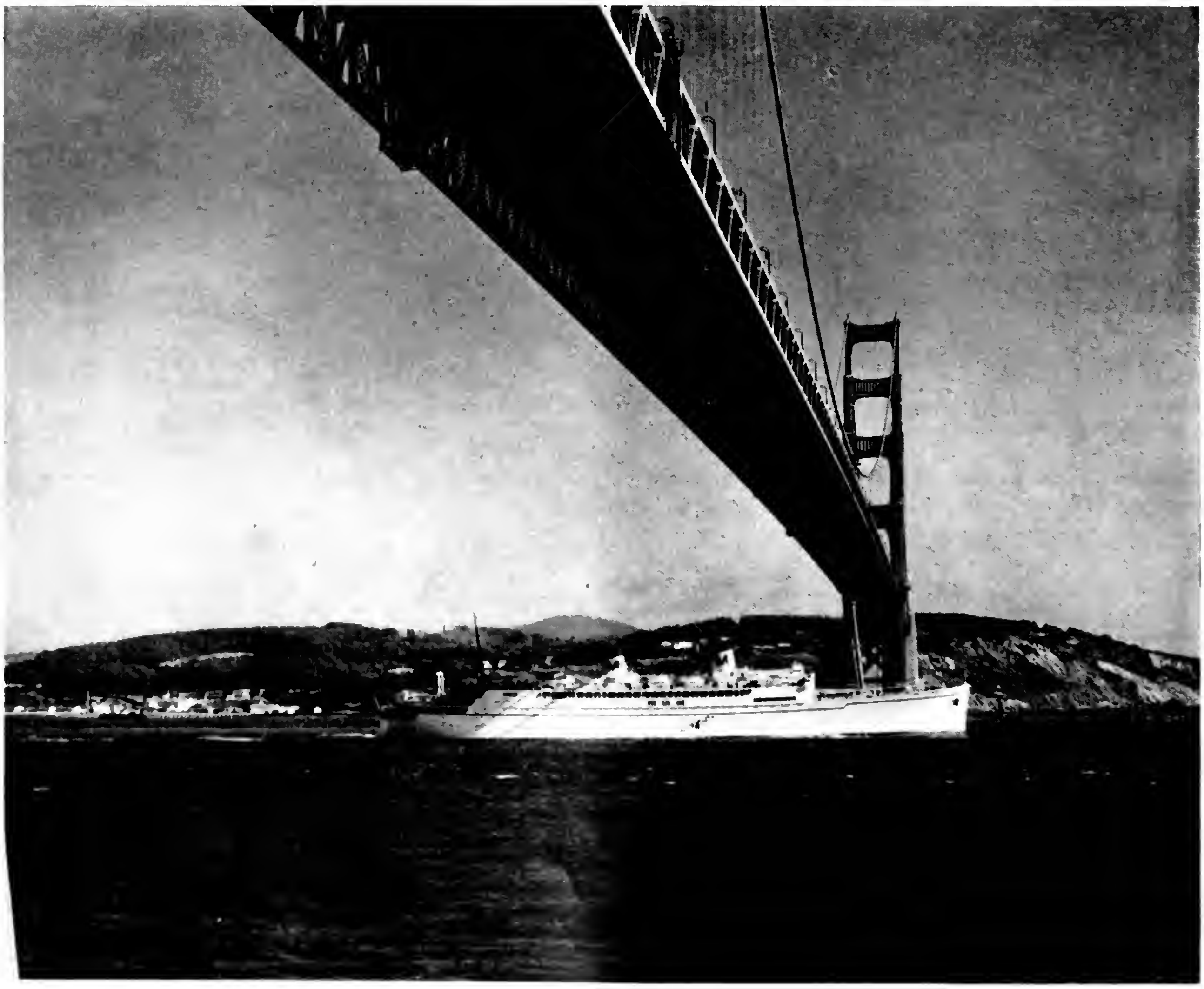
The just reconverted S.S. "Lurline" outward bound under the Golden Gate Bridge.
See May Pacific Marine Review for reconversion story.



The "Mongolia," first passenger liner built by New York Ship. Only eleven other passenger ships built in America have surpassed her in size.

Long a favorite with passengers up and down the West Coast, the "Governor" was built in 1907. Note the tall smokestacks, typical of the period.

New York Shipbuilding Corporation

BULWARK of the nation's defense is its shipyards. Through the ups and downs of economic prosperity levels they must survive by the minds and hands and hearts of their management and the engineering and mechanical skill concentrated in their small industrial islands. In emergency, oceans of war ships have protected this land from invasion, and bridges of merchant ships have held the wars to far away places. In peace time, trade by sea has been the alchemy that has raised civilization standards and set the eyes of the world on the grand horizon that is our shore.

For fifty years New York Shipbuilding Corporation has been a vital part of this scene. Its half-century spans the period from the wooden sailing ship to the steel fleets of today. Of merchant ships, large and small, they have built 359; and of naval construction, from tugs to battleships, 252.

Spanned also has been the continent. From the great yard at Camden, New Jersey, have come ships to make marine and naval history in the Pacific. The whole record, ship by ship, is beautifully laid out in the book "50 Years" just published by the Yard, but it is mainly the vessels of Pacific fame that are pictured here.

The New York Shipbuilding Corporation was organized in 1899. The original plan was to build the new plant on Staten Island, and the company which was formed was therefore called the New York Shipbuilding Company. Inability to acquire the desired site, however, necessitated a survey of other locations down the coast as far as Virginia. The result of investigations by several inspection parties was the purchase of a tract of approximately 160 acres on the east side of the Delaware River in the southern part of the city of Camden, New Jersey, across the river from Philadelphia. The ground conditions were especially suited to the building of ship-

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The Chairman of New York Ship—John F. Metten

A self-made man, John F. Metten, chairman of the Board of New York Shipbuilding Corporation, started working at the age of sixteen as a machinist apprentice in the Wilmington Shops of the Pennsylvania Railroad. Later, in 1893, he became a machinist at the Newport News Shipbuilding & Dry Dock Company and after two years was transferred to the Engineering Department as a draftsman. He was a draftsman at Cramp's Shipyard in Philadelphia in 1900 and became chief draftsman there after four years. In 1909 he was appointed chief engineer, and then vice president in charge of engineering.

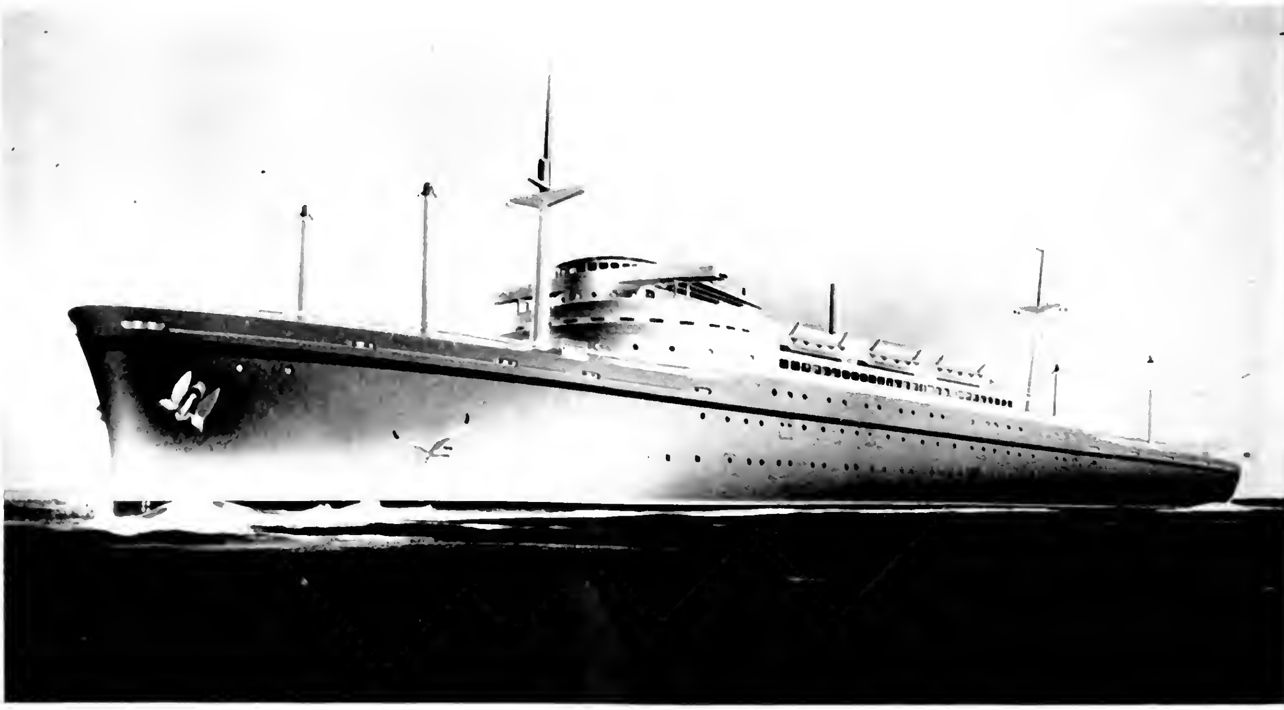
John F. Metten

Selected by the Navy and private shipyards to undertake the first standardization of design for naval construction, Metten became president in 1927 of the Marine Engineering Corporation, which was organized jointly by the Bethlehem Shipbuilding Company, the New York Shipbuilding Corporation and the Newport News Shipbuilding & Dry Dock Company to standardize the design for eight large cruisers of the *Pensacola* class, constructed by these yards and two Naval yards.

In 1930 Metten became consulting engineer for the Matson Navigation Company, the New York Shipbuilding Corporation and the Baldwin Locomotive Works. In 1935 he was named President of the New York Shipbuilding Corporation and in 1943 became Chairman of the Board.

Noted for the simplicity and originality of design, reliability and economical operation of the naval and merchant ships built under his direction, Metten was appointed by the Secretary of the Navy as a member of the advisory board on battleship plans for the Navy Department in 1937.

Current work of New York Ship includes three passenger-cargo liners for round-the-world service of the American President Lines. 536 feet in length, these ultra-modern ships will provide luxurious air-conditioned quarters for passengers.



No list of great liners would be complete without the "Manhattan" and her sister ship the "Washington." Over the years, these 24,000-ton American vessels carried more passengers in proportion to their capacity than any of the giant foreign superliners.

(Continued from page 51)

way foundations, and railway facilities were adequate. Time has shown the selection to have been a good one.

The planning and opening of the New York Shipbuilding Company yard was due mainly to the foresight and energy of the late Henry G. Morse, its first president.

There were five basic objectives followed in the designing and laying out of the new shipyard. Mr. Morse's advanced ideas were the basis of the planned shipbuilding procedure which he contributed to the industry throughout the world. They were largely the result of his extensive structural steel fabrication experience prior to entering the shipbuilding field.

First, the application of the mold loft template system for the fabrication of hull steel—a pioneer undertaking for shipbuilding at that time but now standard practice in the industry.

Second, provisions for prefabrication of relatively large structural assemblies and continuous routing of material from receipt through fabrication shops and on out to the shipways, a method widely publicized as a new development during World War II.

Third, an unusually complete overhead crane system for handling prefabricated structural assemblies up to 100 tons weight.

Fourth, a coordinated series of shops with five large building ways, and an outfitting basin completely roofed over and served with overhead bridge cranes.

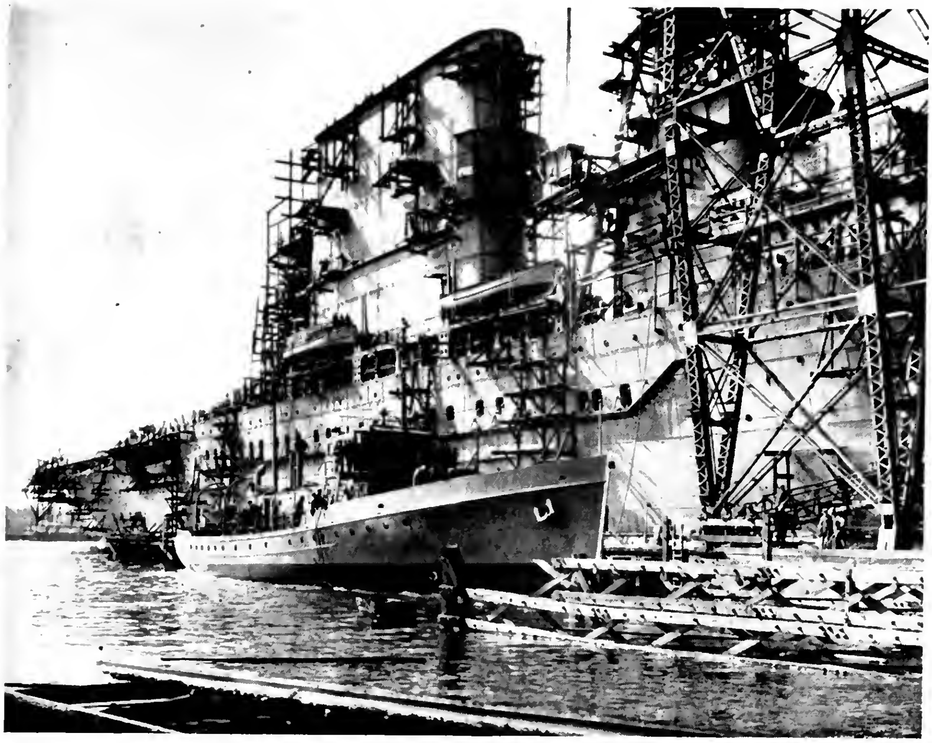
Fifth, installation of propelling machinery and other heavy weights before launching, by providing 100-ton crane capacity over all the building ways.

The First Ships

The first twenty contracts built by New York Ship were secured during the lifetime of its founder. Among them were two of the largest ships ever built for the American Merchant Marine, the *Mongolia* and *Manchuria*, 16,000-ton liners for the transpacific service.

Few ships have ever so successfully served such a variety of routes. Although laid down for transatlantic trade, they were first used as transpacific liners. Pressed into service in World War I, to the *Manchuria* went the

The ferryboat "Santa Clara," built for service on San Francisco Bay. She was knocked down and shipped to the West Coast for assembly there and saw over thirty years of active service.



Opposite: The giant aircraft carrier "Saratoga" in the final stages of construction. After heroic service in World War II, she was sacrificed as a target ship at Bikini Atoll.

Below, left: Erection floor of the Machine Shop with the installation of blading in turbine rotors and cylinders in process. New York Ship has designed and built over 1,600,000 shaft horsepower of turbine work for ship propulsion which has set high standards for economy and reliability in service.

Below, right: A section of the main Machine Shop, which extends entirely across the head of the covered ways. Completely equipped with both standard and specialized machine tools, work ranges from turbine blades weighing a few ounces to machinery parts weighing 100 tons.

honor of firing the first shot at a German submarine. Although the *Mongolia* was scrapped in China in 1947, the forty-five year old *Manchuria* is still in profitable operation as the *Santa Cruz,* running between Europe and South America.

Between 1903 and America's entrance into World War I, some 200 more contracts were secured by New York Ship. Among these were the *President, Governor* and *Congress,* built for Pacific Coast operation.

The Disarmament Conference in 1922 resulted in the

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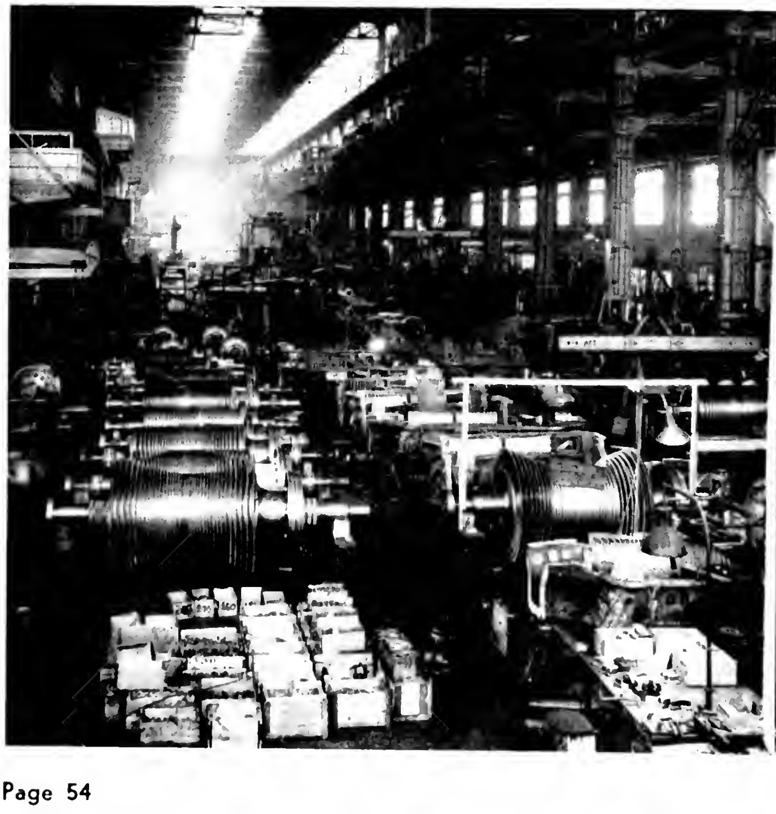
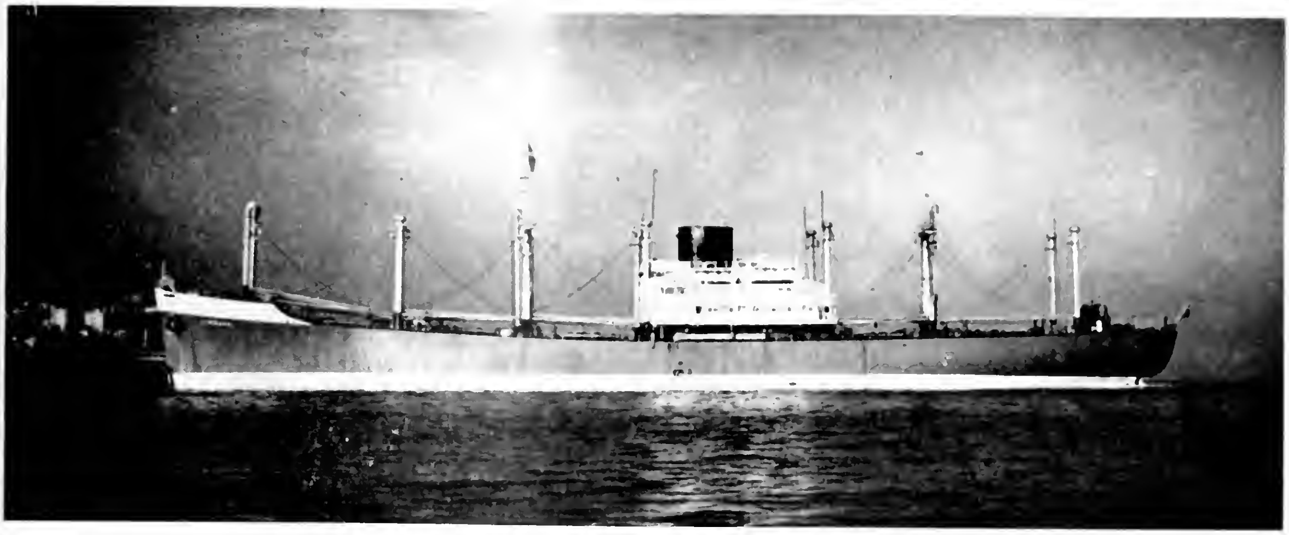




S.S. "Limburg", C-3 Freighter of Java Pacific Line in stream at San Francisco.

Java Pacific Line

JAVA PACIFIC LINE opened its Transpacific service and for the first time directly linked the Netherlands Indies with the Pacific Coast in 1915. After a suspension of some four years, the service was re-established in December, 1927, when Cornelis Winkler, president of the organization, opened a small office at 149 California Street in San Francisco.

E. L. Bargones joined the new company as traffic manager and today is vice president and general manager, while P. J. Van Loghem was the accountant and is now the treasurer of Transpacific Transportation Company.

John Greve, vice president and assistant general manager, was recently transferred to San Francisco from New York where he had spent one year with the Java Pacific Line, Inc., and previously had been with the Royal Rotterdam Lloyd. Harold Taft is general passenger agent for the company which handles the Java Pacific Line, Royal Interocean Lines, Nederland Line, Royal Rotterdam Lloyd, and the Royal Packet Navigation Company.

From the modest beginning the agency progressed and now has branch offices in Los Angeles, Portland, and Seattle. The company is represented by Dingwall Cotts & Company Limited in Vancouver, B. C., and Theo H. Davies & Company in Honolulu.

The Java Pacific Line is operated by two Netherlands steamship companies. One, the Nederland Line of Amsterdam and the other the Royal Rotterdam Lloyd of Rotterdam. Captain P. Kruyt serves as marine superintendent for the former line, while Captain H. A. van der Schoor de Boer is marine superintendent for the latter. The ships of the Java Pacific Line include a number of new C-3s as well as Victories.

In conjunction with the Silver Line, Ltd. of London, the fleet has two distinct fields of operations specializing in the carriage of fast freight, oils in bulk, and refrigerated cargo: 1. Transpacific calling in the Philippines, Indonesia, Straits Settlements, India, Pakistan, and the Persian Gulf. 2. From the Pacific Coast via the Panama Canal to ports in South and East Africa. The return voyages of this latter line were extended about a year ago to include the South American ports of Buenos Aires, Montevideo, Santos, and Rio de Janeiro, the vessels then returning via the Panama Canal to the Pacific Coast.

During the war, Dutch vessels played an important part by serving in the Army and Navy transport services and carried thousands of troops and supplies to all theatres of conflict. Immediately following the Pearl Harbor incident, the Dutch vessels were made available for war service. These ships were chartered by the British Ministry of War Transport and assigned to the War Shipping Administration which in turn allocated the vessels to the Army and Navy.

Following the war through the intermediary of the Netherlands Government the Nederland Line and the Royal Rotterdam Lloyd had constructed by the Sun Shipbuilding & Dry Dock Co., Chester, Pa., eight C-3 types of vessels and, in addition, a number of Victories were purchased.

Besides being Pacific Coast agents for the Java Pacific Line in connection with cargo, Transpacific Transportation Company is also general Pacific Coast passenger agent for this line as well as for the Royal Interocean Lines, Nederland Line, Royal Rotterdam Lloyd, and the Royal Packet Navigation Company ("K. P. M.").

The Java Pacific Line C-3 type of freighter engaged in the Transpacific, South and East Africa, and East Coast ports of South America trades, accommodates twelve passengers in four double and four single specially con-

M.S. "Oranje", 840 passenger liner between Europe, Malaya and Indonesia via Suez.

structed cabins with private showers. These vessels have an attractively furnished lounge with bar, dining saloon and spacious promenade decks.

The public rooms as well as the cabins are air conditioned.

Passengers booked on the Java Pacific Lines are able to make connections at Manila or Singapore with the Royal Interocean Lines' ships such as the Tegelberg, Boissevain, and Ruys. These attractive vessels accommodate eighty-two passengers. The route begins at Yokohama and after calls in China, Philippines and Straits Settlements, continues over to East and South Africa and East Coast ports of South America. Singapore also serves as a connecting point with Java Pacific Line vessels for the Nederland Line and Royal Rotterdam Lloyd, which operate the luxury passenger motor liners *Oranje*, and *Willem Ruys* to Europe via Suez.

Technical details of C-3 Fleet:

These vessels are of the Maritime Commission's basic C-3 design with certain modifications to meet special requirements of the Owners.

They are of Shelter Deck design with a raked stem and cruiser stern having two complete steel decks (Shelter Deck and Second Deck). A third steel deck is fitted below the Second Deck, extending from the stem to the stern, except in way of the Machinery Space.

Propulsion is by Westinghouse, cross compound, impulse reaction type turbine, double reduction; supplied with 440 pounds per square inch gauge pressure and 740 degrees F. total temperature by Babcox and Wilcox Co., single pass, marine water tube, straight tube type boilers. The boilers and turbines are located in the same compartment, the boilers being forward of and in alignment with the turbine and reduction gear units. The allied equipment for the main boilers consists of four oil burners by Babcox and Wilcox, soot blowers and smoke indicator by Diamond Power Specialty Corporation, feed water regulator and combustion control by Bailey Meter Company. Three forced draft blowers were supplied by the American Blower Company driven by 75-horsepower Westinghouse motors. The turning gear for the

M.S. "Willem Ruys", 840 passenger liner in service between Europe, Malaya and Indonesia via Suez.

main turbine was manufactured by Westinghouse Electric, driven by a 10-horsepower motor also by Westinghouse. The main generators and switchboard, supplied by the General Electric Company, provide and distrib-

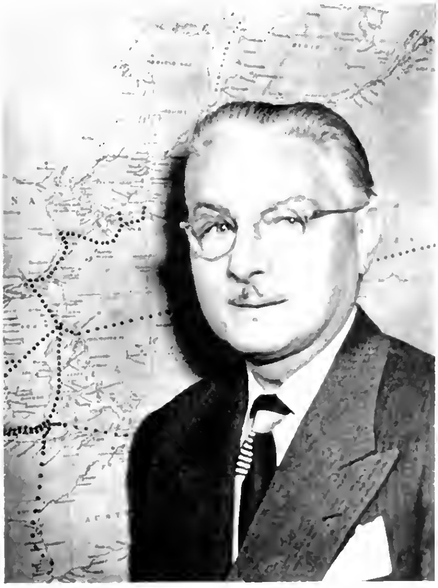
Transpacific Transportation Company executives. Left to right: John Greve, vice president and assistant manager; Cornelis Winkler, president; E. L. Bargones, vice president and general manager.

ute current for electrically driven machinery throughout the ship, for lighting and for the all-electric galley. The generating equipment consists of three General Electric 300-kilowatt 240 volts direct current, single reduction gear turbine generator sets with normal operating condition rating of 440 pounds per square inch steam gauge pressure, 740 degrees F. total temperature at the turbine inlet and 5-inch mercury absolute back pressure at the exhaust flange. The emergency generator set consists of a four cylinder, fan and water cooled, Diesel engine manufactured by Hill Diesel Engine Company driving a 15 kilowatt, 240 volts direct current Louis Allis Company generator.

Lifesaving equipment includes two 28-foot metallic lifeboats, each having a capacity for 59 persons and two 24-foot metallic motor boats, each having a capacity for 35 persons. Lifeboats and motor boats are handled by gravity type davits fitted with motorized winches for hoisting boats from water while lowering of boats to water is accomplished by means of gravity. Lifeboats, motorboats, winches and gravity type davits were furnished by the Welin Davit and Boat Corporation. Motors for winches, rated at 17.5 horsepower, were furnished by General Electric.

Cargo is handled by twelve 5-ton booms, eight 10-ton booms and two 50-ton booms, fitted on seven pairs of kingposts and two 50-ton boom steps. Sixteen American Hoist and Derrick Co. single speed cargo winches driven by 16 General Electric 50-horsepower motors and four American Hoist and Derrick Co. double speed cargo winches driven by General Electric 50-horsepower motors, serve the above cargo booms. Other deck auxiliaries furnished by American Hoist and Derrick Co. and driven by General Electric motors include a spur geared windlass for anchor handling and mooring and a spur geared horizontal type warping winch. A double ram electric hydraulic steering gear was manufactured by American Engineering Co. and driven by two 50-horsepower Westinghouse Electric and Manufacturing Co. motors. Anchors and anchor chain were supplied by Baldt Anchor Chain and Forge Company.

The Galley and Pantry is electrically equipped includ-



Harold Taft, General Passenger Agent, Java Pacific Line, Royal Interocean Lines, Nederland Line, Royal Rotterdam Lloyd, Royal Packet Navigation Company.

On Java Pacific Line's C-3 vessel:

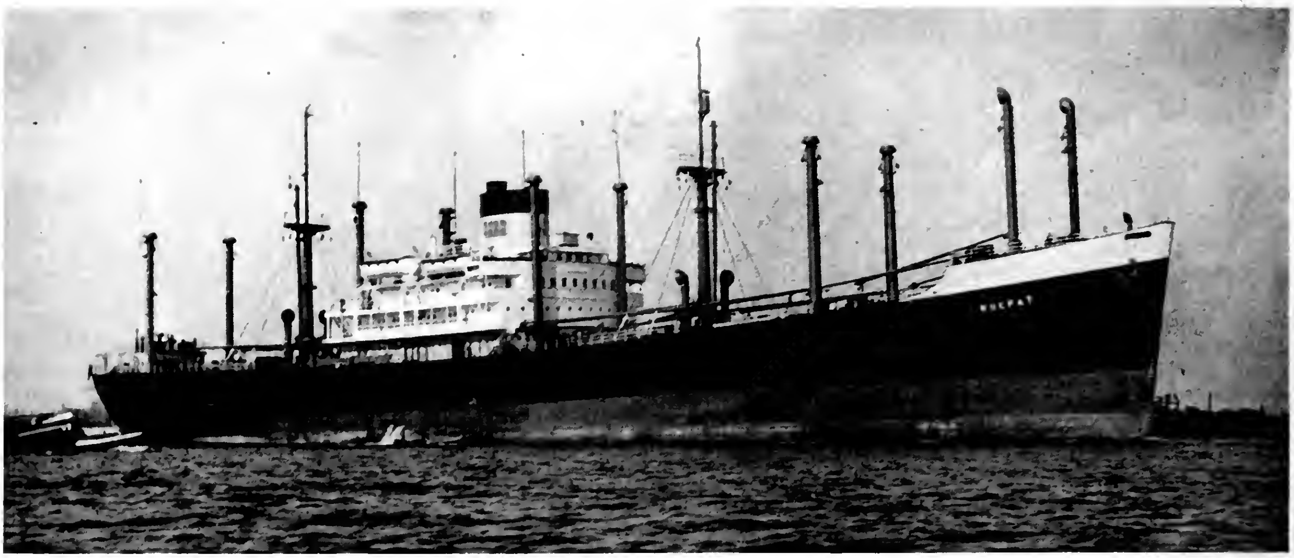
Top: Single cabin with private shower.

Center: Air conditioned dining saloon.

Bottom: Air conditioned lounge.

ing electric range, 12-quart electric mixer two-deck electric bake oven, two electric refrigerators, electric warming oven, electric toaster, electric hot water urn, electric coffee urn supplied by Edison General Electric Appliance Company.

Mechanical ventilation and blower equipment on the vessel comprises the following: Two engine room supply fans rated at 28,000 cubic feet per minute each, Navy standard-axial flow—vertical type—as manufactured by



S.S. "Roepat", another C-3 freighter of Java Pacific Line.

L. J. Wing Manufacturing Co., with motors by Star Electric Co. Two engine room exhaust fans rated at 12,000 C.F.M. each—Navy standard-axial flow vertical type—as manufactured by L. J. Wing Mfg. Co. with motors by Diehl. Two supply fans for quarters rated 9000 C.F M. each—multivane type, one supply fan for Javanese quarters rated 3100 C.F.M. axial flow, one exhaust fan for quarters rated 4400 C.F.M. axial flow, three exhaust fans for quarters and resistor rooms rated 3100 C.F.M. each—axial flow, two exhaust fans for captain's bath and battery rcom rated 250 C.F.M. each—axial flow—all as manufactured by Ilg Electric Manufacturing Company.

The ship's refrigerator is divided into six compartments as follows: Meat room, dairy, fish, vegetable and thaw room. The dairy, fish and meat rooms are serviced by two (one of which is a stand-by unit) vertical, single acting, twin cylinder compressors and two horizontal shell and marine type tube Freon condensers furnished by Carrier Corporation with 10-horsepower compressor motor furnished by General Electric. The vegetable and thaw rooms are serviced by two (one each room) fin type cooling coils with 1/40-horsepower motor driven fan supplied by Wagner Electric Company. There is also a 60-gallon Freon scuttlebutt for ice water furnished by Carrier Corporation.

Navigating equipment includes a master gyro compass, repeaters, course recorder, rudder indicator, current failure alarm by Sperry Gyroscope Company; standard compasses and binnacles by Kelvin-Wilfred O. White; searchlight by Westinghouse; fathometer by Submarine Signal Company; clear view screen in wheelhouse by Bendix Aviation Corporation; radio direction finder, auto alarm bells, radiotelegraph transmitters, radio receivers, crystal receiver and alarm signal keyer by Radiomarine Corporation of America; automatic whistle control by Leslie Company; current failure alarm panel and engine order telegraphs by Henschel Corporation; running light panels by Raymond Rosen and Company; electric telephone system by Hose-McCann, and general alarm bells by Redve Electrical Company.

Among the miscellaneous equipment and materials installed on the vessel are Johns-Manville Marinite for divisional bulkheads supplied by Hopeman Brothers, deck and floor coverings by Selby, Battersby and Company; sash windows by Kearfott Engineering Company; plumb-

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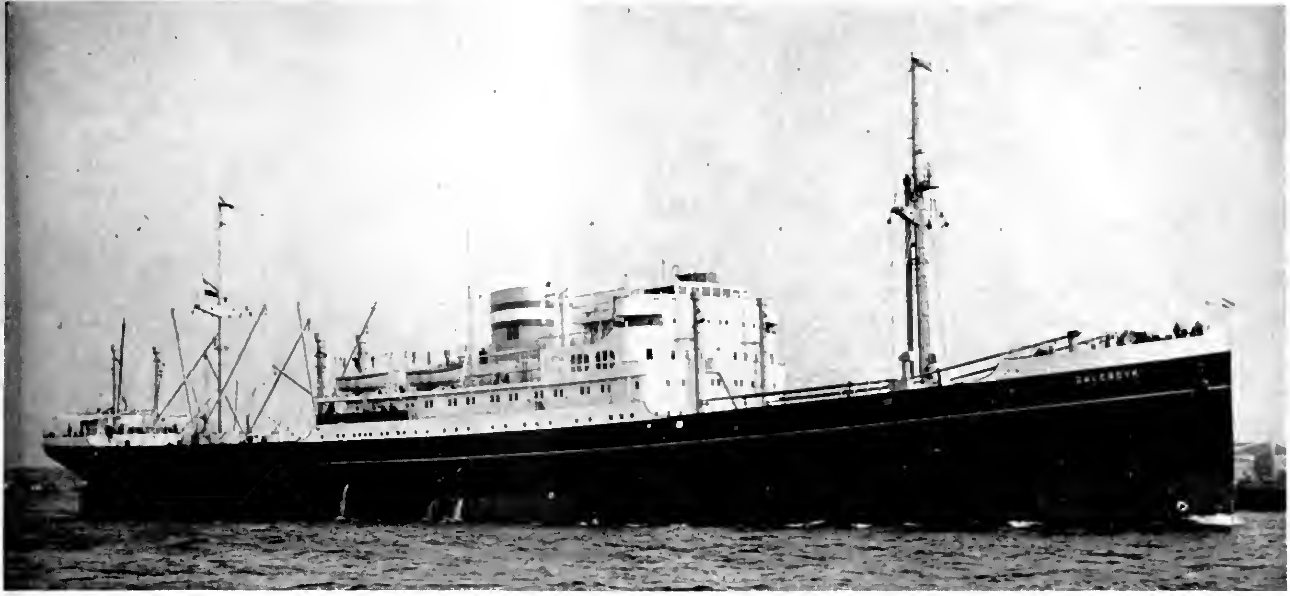
Capt. H. A. van der Schoor de Boer, Marine Superintendent, Royal Rotterdam Lloyd.

Capt. P. Kruyt, Marine Superintendent, Nederland Line.



THE "DALERDYK"

"Dalerdyk" Augments Holland-America's Service to Pacific

LATEST addition to the North-Pacific Coast Service of Holland-America Line is the *Dalerdyk,* a completely new ship built on the hull of the *Damsterdyk,* from which her name was changed because the rebuilding job was so complete. The old *Damsterdyk,* built by the Wilton-Feyenoord plant at Schiedam in 1930, was seized by the Germans in Rotterdam in 1941 and discovered in Hamburg in 1945 in a badly damaged condition from aerial bombs. The job of reconditioning her (also done by Wilton-Feyenoord) was completed late in 1948.

The *Dalerdyk* arrived on the West Coast in April 1949 on her maiden voyage from Europe. She has new stack, superstructure, holds and engines, and her gross tonnage is 10,820. Gross tonnage of the *Damsterdyk* was 10,155.

Her length overall is 509′ 2½″, and her cargo capacity is 598,915 cu. ft. including 152,095 cu. ft. of refrigerator space. Her main propulsion consists of two single two-stroke Sulzer solid-injection Diesel engines, each engine developing 4,200 shaft horsepower.

All but one of the 23 staterooms, which accommodate 46 passengers, are outside, and all have private baths. There are three public rooms, lounge and smoking room located on the boat deck, and dining room on B deck forward.

Designated the flagship of the line's North-Pacific Coast service, the *Dalerdyk* is the third vessel to go on the postwar schedule. The other two vessels are the *Delftdyk* and the *Duivendyk.* A new vessel the *Diemerdyk,* is expected to be commissioned in 1950. This will bring the route up to its prewar strength.

Top: One of the 10 single cabins on the "Dalerdyk."
Bottom: Dining saloon.

Top: Lounge of the "Dalerdyk."
Bottom: Smoking room.

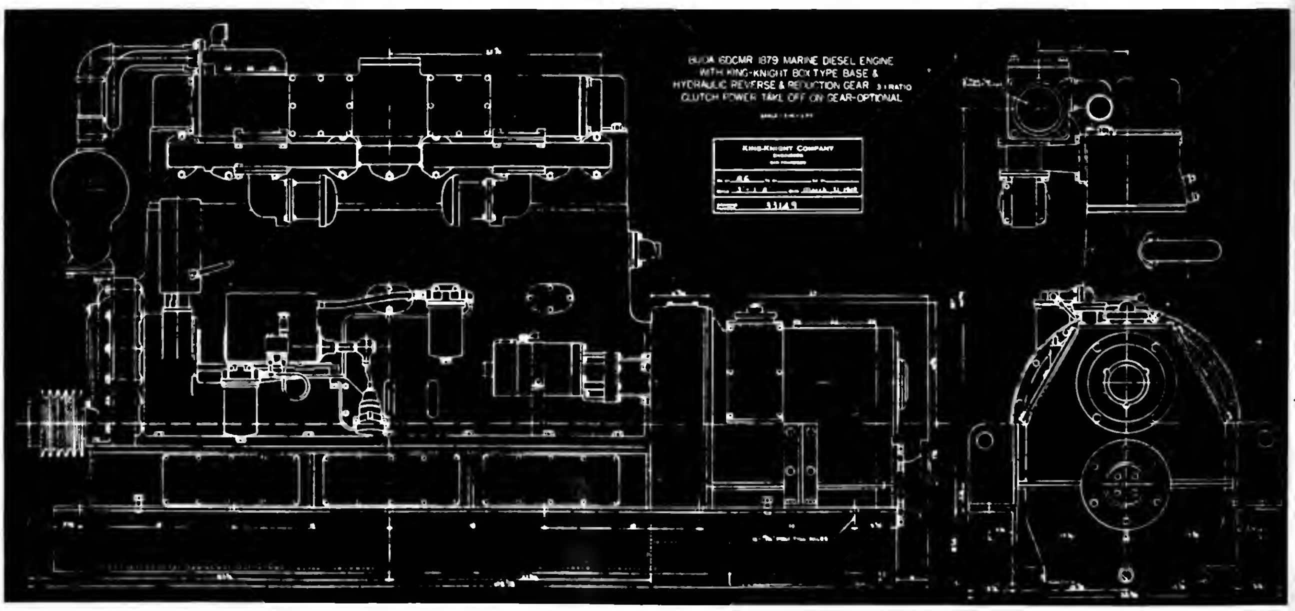
"W. M. Wightman"

Repowering of Quarantine Vessel "W. M. Wightman"

SUCCESSFUL sea trials were recently completed by the *W. M. Wightman,* a quarantine vessel, after having a new engine installed by the Pacific Dry Dock and Repair Company. A steel vessel, 60 ft. 10 in. in length by 15 ft. beam, with a draft of 8 ft., the *W. M. Wightman* is operated by the U. S. Public Health Service of which Dr. E. W. Norris is the Medical Officer in charge of the San Francisco office. Used for U. S. Quarantine Service, the vessel is well known to the maritime public, as one of her duties is to take the medical officers to and from ships entering the harbor, to clear them through quarantine.

With the new engine installed, the vessel is not only much more maneuverable, which is essential to her

The Buda marine diesel engine on the "Wightman" has 6 cylinders and develops 185 horsepower at 1000 rpm.



duties, but has also picked up her speed. In the trials she exceeded expectations by doing better than 10 knots.

The engine installed is the well-known Buda Model 6DCMR-1879, full diesel, 4 cycle, heavy duty engine. This engine has 6 cylinders, 6¾" bore, 8¾" stroke, and operating at 1000 r.p.m. has a continuous rating of 185 HP, developing this rating with 80 p.s.i. The engine is equipped with a 32 volt electric starting system but can be optionally furnished with either air starting or gasoline engine starting.

The cooling system used is a dual heat exchanger and lube oil cooler—the engine being cooled by fresh water. This system protects the water jackets against corrosion and filling up with mud and alkaline deposits due to operation in the muddy waters of San Francisco Bay. It also allows operation of the engine at a higher and better working temperature than would be possible if salt water cooling were used.

The King-Knight Company, Northern California Distributor for the Buda Company, installed on the engine a special box base with three large, removable handplates on each side, through which all main and connecting rod bearings can be readily inspected, removed or replaced. They also installed an engine-mounted, manually operated sump pump to allow the quick draining of oil from the engine base without the necessity of removing the hand-hole plates, using portable pumps or other means of draining.

At the time of installing the box base the King-Knight Company also installed a hydraulic reverse and reduction gear, 3:1 ratio, which is manufactured by the Western Gear Works of Lynwood, California and the Associated Pacific Gear & Tool Works. The clutches on this gear are on the low speed shaft and are operated hydraulically by oil pressure supplied from a pump installed in the gear. This hydraulic Western Gear has a positive neutral and is operated by a lever which gives finger-tip control for ahead or astern. A feature of the hydraulically actuated clutches in the gear, is that they can be thrown from full ahead to full astern without the necessity of slowing down the engine and without any attention to the clutch or the engine. This is a very important feature in the quick maneuvering that must be done in handling this vessel in its boarding operations.

Another feature of the Western hydraulic gear is the auxiliary clutch power take-off which in the *W. M. Wightman* is used to drive a Gardner-Denver Air Compressor for charging their air tanks. This power take-off is actuated by a hydraulic clutch built into it, so that the air compressor can be operated at the will of the operator, although it is also equipped with an unloader which cuts the compressor out of service at 200 lb. pressure in the air tanks, and cuts it back into service at 175 lb.

The Western hydraulic clutch power take-off can be used regardless of whether the main gear is in neutral, ahead or astern. Up to 60 horsepower can be taken off of the Western power take-off.

While the hydraulically operated gear lends itself very readily to pilot house control, the *W. M. Wightman* is at present operated by conventional bell signals. A special control system is mounted on the after end of

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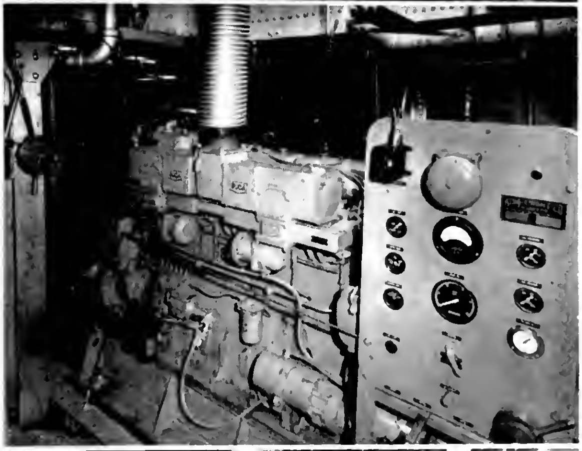
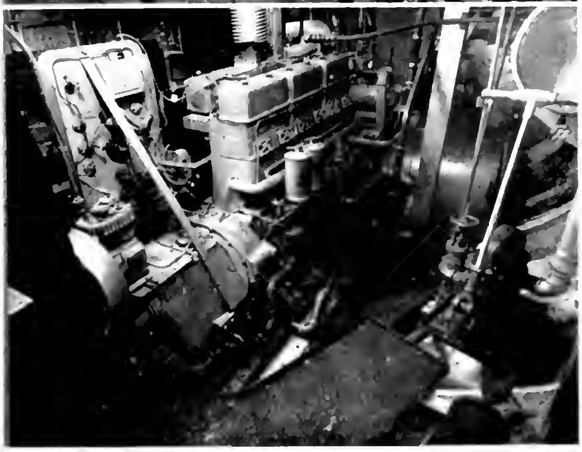
Top: General view of engine room. Note the compactness of Buda installation. Also shown is the Fairbanks-Morse auxiliary generator set.

Center: View of operator's side of Buda engine, showing control panel and instruments and box base with removable handle plates.

Bottom: Starboard side of engine showing Western Marine Gear Model No. 72, hydraulic reverse and reduction gear, with power take-off driving air compressor.





The "Trabzon"

—Todd Converts Motorship for Turkey

ONE of the most extensive ship reconversion jobs on the West Coast since the end of World War II has been finished at Todd Shipyards Corporation at Alameda, Calif., with transformation of the former Navy Troopship *Imperial* to a passenger liner, for the Turkish Government.

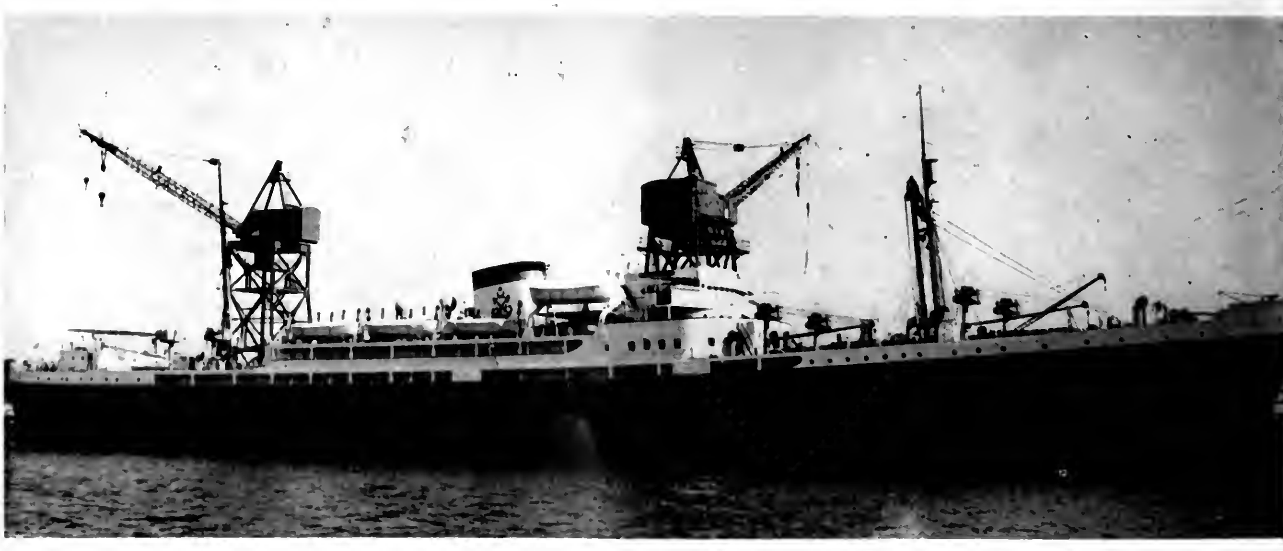
The 7200-ton motorship, built in Denmark in 1939 for the "Chilean Line", has been renamed the *Trabzon*. The *Trabzon*, which will operate in worldwide waters with Istanbul as her home port, has accommodations for 413 passengers and 87 crew members. Passenger accommodations include those for 119 first, 70 second, 49 third, 90 fourth and 95 deck or steerage class passengers, and in addition, the vessel's accommodations provide for a special owner's cabin.

The reconversion work included complete overhauling of the ship's deck machinery, renewal of the entire rigging, disassembly and repair of all lifeboats to bring them up to the standards of the United States Coast Guard, and the American Bureau of Shipping, as well as the addition of two new-type gravity lifeboats, the renewal of 10,000 feet of decking and the caulking of 60,000 feet of decking. The hull was sandblasted to bare steel from keel to bulwark rail. The bottom was painted with the usual coats of primer, anti-fouling, anti-barnacle, apexior and boot-topping to the water line. The hull was painted black, superstructure white, booms and masts buff, and stack in a 5-band arrangement of yellow-black and white with the Turkish symbol in red.

The main engine was disassembled to the bedplate and was rebuilt from the bottom, with the No. 1 cylinder completely renewed. One 30-ton section of the crankshaft was removed for repair, checked for truth, and new journals made for it. All engineroom auxiliaries were disassembled and repaired.

A new tailshaft was installed, and the vessel's stern tube was rewooded. The propeller was overhauled for balance. New portholes were installed. Eight thousand rivets were caulked and welded on the ship's bottom while she was in dry dock. All water tanks were chlorinated and new drinking fountains and bubblers were installed throughout the ship. New, remote control

The "Trabzon" at Todd's outfitting dock.



THE M. V. "TRABZON"

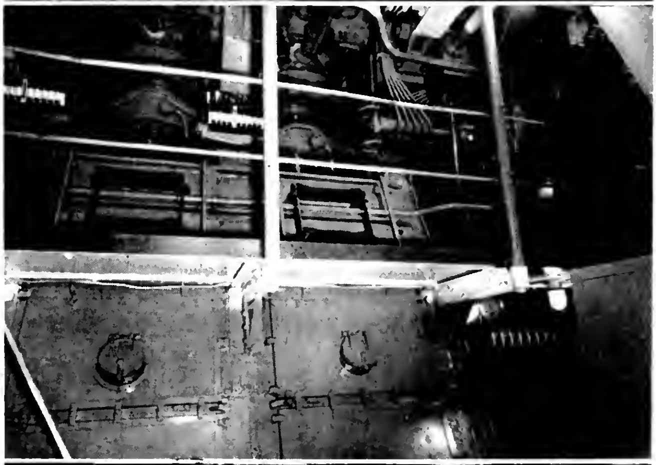
Above: One of new Welin life boats and davits. The winch also is by Welin.

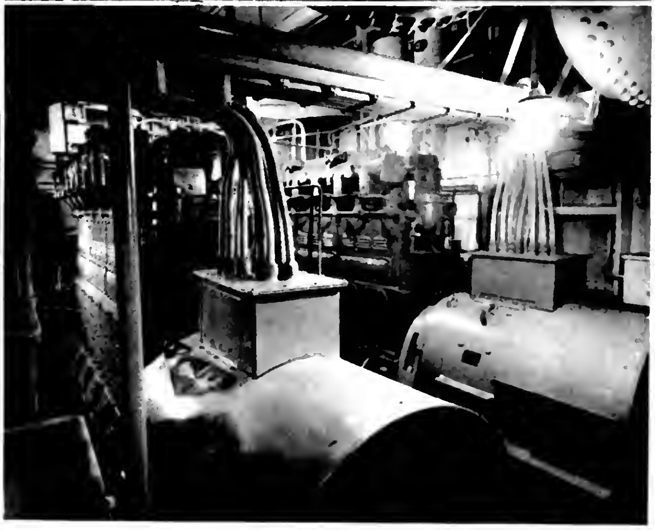
Opposite.
Top: Raked single stack with Turkish Merchant Marine insignia. Boat deck has two Markey winches.

Center: Main engine, Burmeister & Wain. Main central station at lower right.

Bottom: Two of three Enterprise Diesel Auxiliaries with Westinghouse generators.

Below: DeLaval Separators on the "Trabzon". These were overhauled in Todd's $800,000 conversion.





watertight doors, which are operated from the ship's B and C decks, were installed.

The refrigeration, ventilation, fire detection and control, electrical and sanitary systems were completely overhauled to comply with safety-at-sea requirements. A hospital and operating room, barber shop, and laundry were installed for both first and second class passengers.

The vessel was purchased from the United States Maritime Commission by the Turkish Purchasing Commission, headed by H. Ugan, and she will be operated in worldwide waters by the Turkish State Seaways and Harbors Administration (Denizyollari). She is 440 feet

Main lounge of "Trabzon".

6 inches in length, 58 feet abeam, and registered at 7200 gross tons. The *Trabzon* is one of three sister ships which have undergone similar reconversion work in Todd yards in the United States and, according to Ugan, she brings the number of vessels purchased from the Maritime Commission by the Turkish Government since the end of the war to a total of 17 ships. Todd completed work on the *Istanbul,* flagship of this fleet, last year, as well as work on several Victory ships and a T-2 tanker. The company is putting the finishing touches on the 385-foot liner *Adana,* ex-*Monterey,* at the Hoboken yard and the *Girssun,* ex-*Aconcagua,* and *Cankiri,* ex-*Copiapo,* at the Brooklyn yard. The last two are sisterships of the *Trabzon.* The three sisterships are equipped with Burmeister-Wain diesels.

THE M. V. "TRABZON"

Opposite, top and bottom: New Welin boat and winch.

Center: Raised winches, distinguishing feature of Danish-built "Trabzon".

Below: Bar in First Class Lounge of Turkish ship "Ordu". The "Ordu" is similar to the "Trabzon" but was converted by Todd's New York yard.

TURKISH SHIP "ORDU"

Top: First Class stateroom.

Center: First Class music room.

Bottom: Corner of First Class dining salon.

New York Shipbuilding Corp.

(Continued from page 54)

scrapping of the battleship *Washington* when nearly completed, although the Colorado was finished and the Battle Cruiser *Saratoga* was converted into the first major aircraft carrier of the United States Navy. The life and death of this great ship will have created for itself and its builders a place in history. But the *Saratoga* was not the only vessel planned for one service and used for another. The *Wolverine State*, renamed the *President Harrison,* was captured by the Japanese, although her captain had attempted to destroy her by running aground at full speed. She survived, was repaired by the Japanese and eventually was sunk by an American submarine.

Building the *Manhattan* and *Washington* for the world's premier passenger ship service was a noteworthy accomplishment for New York Ship. With geared turbine propelling machinery of the yard's design, these twin liners carried the American flag on the North Atlantic in competition with the largest and fastest ships of the world. They brought such luxury and performance to cabin class liner service that the leading foreign lines were forced to abandon the designation first class to bring their fare categories to a level with those of the *Manhattan* and *Washington* for competitive purposes. Their introduction marked a new era in Atlantic travel. As the transports *Wakefield* and *Mt. Vernon,* these vessels, like their predecessors, rendered yeoman service.

The New APL Ships

Most recent of New York Ship's triumphs is the contract for the American President Lines' round-the-world liners. (See artist's drawing on page 52.) Three of these are under construction. The last word in liner construction, they will open a new era in beauty of line. The yard and the men have done well.

New York Shipbuilding Corporation's Naval Construction:

Battleships	11
Battle Cruisers	3
Light and Heavy Cruisers	26
Aircraft Carriers	12
Destroyers	43
Tenders and Repair Ships	6
Landing Craft LCT	100
Landing Craft LCI	48
Miscellaneous*	3

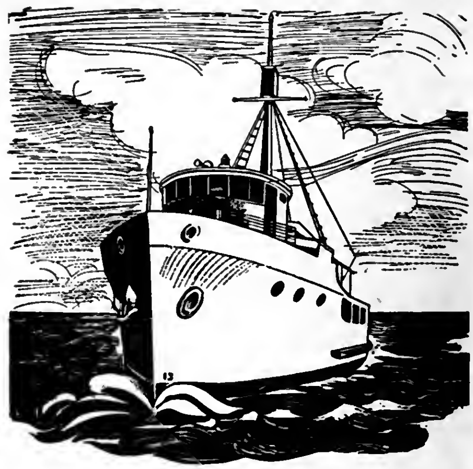
*Included fuel ship for Japan and two sea-going tugs.

And Merchant Ships:

Passenger-Cargo	39
Tankers	37
Colliers	22
General Cargo	7
River Steamers and Ferryboats	10
Light Ships and Tenders	18
Dredges	11
Car Floats and Barges	161
Miscellaneous*	54

*Includes Patrol Boats, Revenue Cutters, Fireboats and Tugs.

Coast Commercial Craft



Largest Gasoline Tanker Barge

Barge 12, the largest gasoline tanker barge to be built on the West Coast, and the latest addition to the Bay Cities Transportation fleet, was launched at the yard of the Pacific Coast Engineering, in Alameda, May 17, 1949.

The vessel is reported to be the largest non-propelled bulk oil carrier in the United States. Its principal dimensions are 230′0″ length by 46′0″ beam by 16′0″ depth 'midships with a capacity of 26,150 barrels of oil products. The vessel was designed by the Pacific Coast Engineering Company to carry Grade B, C and D liquids as defined in the tank vessel regulations of the U. S. Coast Guard It is fitted with three diesel engine driven pumps and is fully equipped for service as an unmanned barge for river, harbor and special coastwise duty.

The hull is divided into 18 tanks by means of two longitudinal bulkheads extending the full length of the vessel and 7 transverse bulkheads extending the full breadth of the vessel. The engine room for the pump diesel engines is isolated from the cargo tanks. Access to the engine room is provided through a large campanionway hatch located on the after deck; while access to the pump room is provided by two 24″ x 24″ watertight hatches. The hull of the Barge is longitudinally framed in excess of the classification requirements of the American Bureau of Shipping. All shell plating is 1/16″ thicker than required in order to increase the life of the vessel while in the oil carrying service. Engine driven exhaust ventilators are provided in both the pump room and the engine room while 10″ vents terminating in return bends provide ventilation for the forepeak. The cargo piping system of the vessel is so arranged that the center tanks are filled and discharged through one pumping unit which is isolated from the balance of the barge piping system. In this manner the vessel can carry two grades of petroleum with no fear of contamination.

"Barge 12"

The three cargo pumps are Kinney Heliquad Model #HQAC-14731, each driven by a Grey Marine Diesel Engine 4½″ x 5″, 145 HP @ 1800 RPM. The pumping units are connected through a 150 H.P. 3:1 reduction gear unit, designed and built by Pacific Coast Engineering Company. Two hand bilge pumps are provided, one for the forepeak and one for engine and pump rooms. The vessel is equipped with ground tackle, consisting of two 750 lb. Danforth Anchors and one cable reel mounted on the deck forward. A 1,000 lb. capacity anchor davit is provided for handling the

anchors.

In addition to the generators provided on each diesel engine, a 1 KW 32 Volt Kurz & Root generator is driven by the power takeoff of the center engine. In addition, a 1 KW gasoline driven generating set is provided for charging the lighting batteries. The entire electrical installation of the vessel is provided by Ets-Hokin & Galvan, of San Francisco. Two heavy duty Hyde Capstans are installed on the main deck, one forward and one aft. Three 50′ length of 4″ rubber cargo hose manufactured by the Goodyear Rubber Co. are carried in specially designed racks on the deck and are attached to the pump discharge header.

All cargo valves of the vessel are the Marco-Nordstrom plug type. Two large towing pads are provided at the bow of the vessel, each furnished with a 2½″ shackle to which the towing bridle will be attached. The exhaust piping from the diesel engines passes through the stern of the vessel and 4″ valves are provided at the shell to maintain a watertight engine room while the barge is at sea. The owners have applied to the American Bureau of Shipping for a load line classification for special service between the Ports of Seattle, Washington and San Diego, with San Francisco as the home Port.

This vessel is the tenth hull to be launched by Pacific Coast Engineering Company during the postwar construction period and represents the largest hull to be built by this concern in their long record of service to the Maritime Industry.

The keel is being laid for another oil barge, whose principal dimensions will be 195′0″ x 40′0″ x 10′6″.

Socony-Vacuum Tug Converted to Diesel

"Socony 23"

Converted from steam *Socony 23* of the Socony-Vacuum Oil Company, Inc., has gone into service again in the New York Harbor area with its original horsepower increased from 600 to 1200 by means of a 12 cylinder, 2 cycle General Motors Diesel engine.

In addition, the tug has been entirely rehabilitated and modernized to handle the new, larger type of barges used for transportation of oil products in bulk.

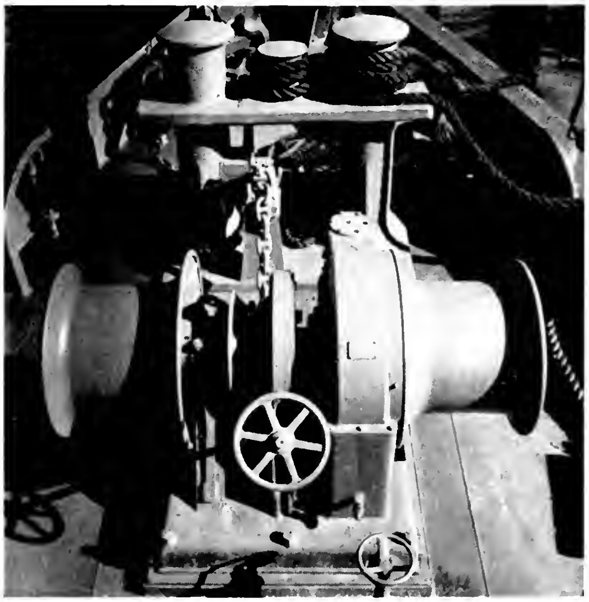
Conversion of *Socony 23* is part of a general Socony-Vacuum modernization and rehabilitation program which includes the acquisition of a new tug last Fall.

Socony 23 was built originally in 1929 by the United Drydocks, Inc., now Bethlehem Steel Company of New York. Its overall length is 97 feet and its molded depth averages close to 10 feet. Its hull is steel with riveted construction and the vessel has a loaded displacement of about 358 tons. It carries a crew of 12. With its conversion, *Socony 23* can tow one of the new 17,500-barrel loaded barges at a speed of seven and a half knots.

Travelling light, the tug has an average speed of almost 14 knots and can go from full speed to a dead stop in the water within 22 seconds. Its bunker capacity is 22,000 gallons and it has 38,000 pounds of ballast to increase the stability.

Ferdinand Wigt, chief engineer on "Socony 23," in the engine room of the vessel.

Side Towing vs. End Towing



Bow of Santa Fe tug "Edward J. Engel" showing Markey Windlass and towing bitt installation described in article.

Every day the Santa Fe Tug *Edward J. Engel* can be seen maneuvering its 14 car railroad barges across San Francisco Bay on a continuous 24 hour service. Regardless of weather, traffic or conditions, the operation is maintained on a strict railroad schedule.

The method used in handling the barges is most interesting because of the unique combination of modern equipment and age old princples. Time has proven both the economy of the operation and the type of equipment.

Traffic on the bay and the need for careful handling at the terminals make it desirable for the tug to operate from a position alongside the barge as commonly practiced where water is smooth and no serious damage is likely to tug or barge. However, the course between terminals crosses the currents of the Golden Gate. Westerly winds, fresh from the Pacific can and frequently do make towing mandatory to the safety of the tug and barge. The transition in methods must be made with as

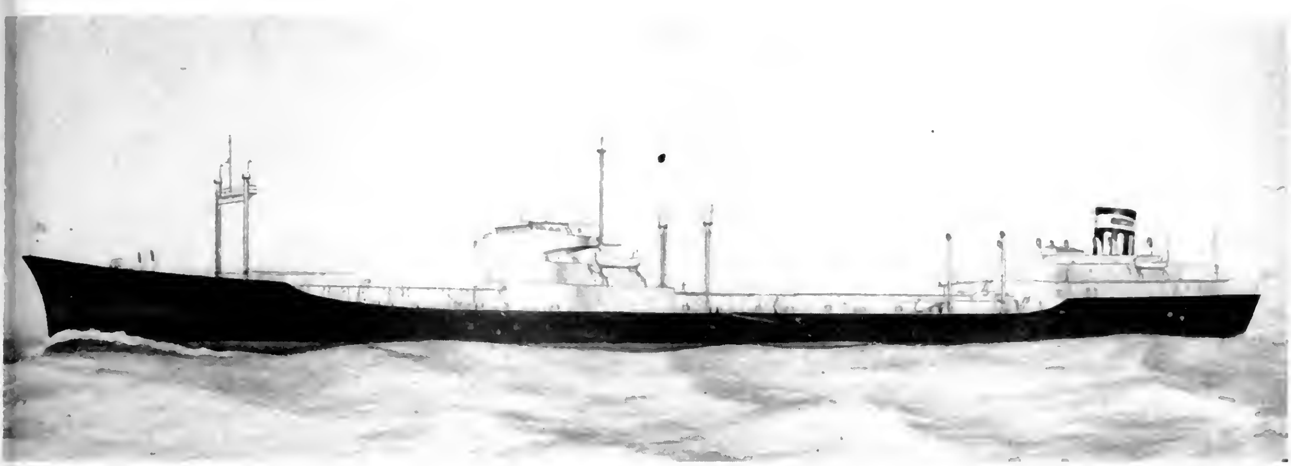
(Please turn to page 94)

Stern of "Edward J. Engel" showing neat installation of hardworking Markey Towing Machine used in towing fifteen car barges during crossing of San Francisco Bay.

"EDWARD J. ENGEL"

On the Ways

New Construction—Reconditioning—Repairs



Artist's drawing of 30,000 ton tanker.

30,000 Ton Tanker

The keel for the first of three tankers for Philadelphia Tankers, Inc. was laid by New York Shipbuilding Corporation April 18, 1949.

These Tankers are among the largest now building, being 660 feet long, 85 feet beam, with a draft of 34 feet when carrying the full dead weight load of 30,000 tons. In crude oil the cargo capacity is 257,000 barrels, with the ships designed for a service speed of 17 knots. Keels for the second and third ships will follow at approximately two month intervals, with the delivery of the first ship scheduled for May 1950.

Quick Propeller Change

The American President passenger liner "President Jefferson" on the blocks at Todd's Hoboken shipyard where she was drydocked overnight having her propeller changed and the name-plate on her stern repainted.

Current World Trade Data

The following current information concerning trade with foreign countries is quoted from the Foreign Trade Bulletin of the American National Bank of Chicago through the courtesy of A. M. Strong, vice president. Complete details regarding any matter mentioned can be obtained from their Foreign Department. While the data has been compiled from sources which they consider reliable, it is disseminated without responsibility on their part.

Brazil

The backlog of foreign collections continued to grow during the past month, and delays in dollar remittances increased in length in consequence of difficulties surrounding the acquisition of dollar exchange. The delays in Rio de Janeiro range at present from six and one-half to seven and one-half months for remittances covering first-category merchandise and from eight to nine months on fourth-category goods.

Canada

The Canadian Foreign Exchange Control Board's policy of limiting remittances of earnings by Canadian subsidiaries and branches of foreign companies to one year's earnings during each fiscal year has been modified. According to the Board's 1948 report, favorable consideration has been given since November 1948 to applications by Canadian subsidiaries and branches who have an accumulation of earnings made since 1939 to remit to their parent companies more than one year's accumulated earnings in cases where their net cash position is abnormally large and clearly surplus to their actual and anticipated requirements.

Profits paid to U. S. companies by their Canadian branches and subsidiaries totalled $118,335,158 in 1948, compared with $124,126,951 in 1947 and $106,267,982 in 1946, according to information given the House of Commons on behalf of the Government.

Chile

An airgram from U. S. Embassy at Santiago states foreign trade licensing under the gold law and barter transactions were active during March. To date the importation of approximately 1,800 new automobiles has been authorized under the provisions of the gold law. Wine is the commodity most readily exportable by barter.

Printing ink, printing metals, and spare parts for printing machinery, imported by newspaper publishers, heretofore subject to the banking rate of 43.10 pesos to the dollar, will henceforth be paid at the 31.10-peso official rate. Dollar receipts for exports of soap bark, beeswax, hemp fiber, almonds, and walnuts, formerly liquidated half at the official rate and half at the banking rate, are now liquidated seventy per cent at the banking rate and thirty per cent at the official rate. Wool exports will be liquidated forty per cent at the official rate, instead of fifty per cent as heretofore.

A United States market for exportable surpluses of agricultural, forestry and fisheries products is sought by the Government of Chile, according to the American Embassy in Santiago. It is understood that the Chilean Government desires to promote such exports rather than depend on disposing of surpluses through barter arrangements with soft-currency countries.

A list of the commodities offered, showing estimated quantities available, may be obtained on request from the Commercial Intelligence Branch, Department of Commerce, Washington 25, D. C. For further information, inquiries may be addressed to the Minister of Commerce and Economy, Santiago, Chile.

Colombia

There was an unfavorable balance of payments during 1948 of $32,000,000 resulting from the issuance of exchange authorizations totaling $316,000,000 against dollar exchange receipts of $284,000,000. Despite efforts to overcome this trend, it has continued in 1949. The Office of Exchange Control revealed that by mid-March Colombia had accumulated an unfavorable balance in excess of $20,000,000 since the first of January. An even more rigorous policy of import curtailment is expected as a result.

El Salvador

An airgram from U. S. Embassy at San Salvador states Salvadoran merchants report that both wholesale and retail trade during February and early March were satisfactory. In fact, a general improvement was noted com-

pared with the rather slack business conditions of the preceding few months. The local market is now described as good, but keen competition in all lines of merchandise has made volume sales harder to get, and lower prices through reduction in mark-up are becoming more common.

Gold and foreign-exchange holdings of the Salvadoran banks stood at $39,907,802 (U. S. currency) at the end of February, an increase of almost $8,900,000 since the beginning of the year. Such an increase is normal at this time of the year when the receipts from coffee shipments are at their peak. Moreover, with merchants predicting a falling off in import volume this year, there is expectation that in 1949 El Salvador's already very favorable balance-of-exchange position may be even further enhanced.

France

An important step in elimination of travel barriers was taken April 1, when France abolished the visa for U. S. citizens entering France and some French possessions, reports the French National Tourist Office. A valid passport, however, is required for entry.

The new ruling, covering U. S. citizens who intend to stay three months or less, applies to France, Andorra, Algeria, Morocco, Tunisia, Guadeloupe, Martinique, Guiana and Reunion.

Germany

Effective April 11, 1949, the export procedure now in existence for the U. S. and U. K. zones of Germany was made applicable to the French zone, according to Addendum C to the Revised Instruction No. 1 of the Joint Export-Import Agency dated April 5, 1949. The export regulations described therein have since been amended with respect to exports to certain areas, but they are still applicable for exports to the United States, the Sterling Area, and countries participating in the European Recovery Program.

Extension of the liberalized export procedure to the French zone was made possible by activation of German foreign trade banks (Aussenhandelsbanken) in the French zone on April 11.

It is expected that the present import procedure for the Bizone will be put into effect in the French zone shortly. In the meantime an interim procedure has been adopted whereby the foreign trade banks are given responsibility for handling the financial arrangements and issuing import permits under the existing French zone procedures. For the time being, import contracts for the French zone will continue to be negotiated by the Baden-Baden branch office of JEIA, its representatives abroad, or by German importers acting on behalf of the branch office.

Guatemala

There has been submitted to the Guatemalan Congress a proposed decree to restrict the importation into that country of goods which are considered to be nonessential under present circumstances. In the list of articles submitted by the Ministry of Finance, on which import restrictions are proposed, are such items as automobiles, radios, clothing, tobacco, and preserved meats. Figures recently released show that Guatemala's trade with the United States in 1948 indicated an import balance of approximately fifteen per cent.

It is interesting to note that up to the present Guatemala has been one of the few countries in the world which has imposed no form of control of exchange.

India

In order to obtain a sufficient supply of agricultural tractors, the Government of India has decided to allow the liberal importation of these machines subject to the following principles: All tractors must have at least 10 draw-bar horse power when operating on kerosene or diesel fuel; no gasoline powered tractors may be imported; tractors from the United States must have the "Nebraska Test" certificate.

The Ministry of Agriculture reserves the right to distribute all imported tractors according to regional needs, regardless of the sales commitments made by the importers.

India's Finance Minister stated on April 6 that from January to November 1948 India had a deficit of $182,000,000 in her balance of payments with the United States. The deficit was met by borrowing from the International Monetary Fund and by spending multilaterally convertible sterling available to India.

Israel

All foreign exchange transactions are subject to the

(Please turn to page 74)

The Marshall Plan Sales Planner

The Westinghouse Electric International Company has prepared a step by step outline of procedure in soliciting and handling sales under the European Recovery Program. The chart shows the distribution in dollars of the various classes of commodities involved. The following is the Westinghouse outline of procedure.

Step 1. Decide How Extensively You Wish to Participate in Marshall Plan Business.

The extent to which you will participate in the Marshall Plan is a matter of company policy. Your decision may be based on the desire for immediate business or on the company's long range objectives. Your considerations will include all factors which normally affect any sales expansion program. They may also include some of the peculiar advantages of foreign trade, such as the ability to broaden the company's markets; to reduce the ratio of risk to profit; and to stabilize employment and profits by offsetting seasonal and cyclical peaks and valleys.

Step 2. Plan Sales on the Basis of Marked Analysis

The sales potential of your products in Marshall Plan countries is not limited to sales in which ECA dollars are used. It may, however, be limited by competition, price, design, specifications, and the customs of the individual country. Therefore plans should be based on market research.

(For a market research starting point, refer to Part I, Chapter 4 and Appendix B of the third edition of "How To Do Business Under The Marshall Plan." Other sources include the Field Offices of the U. S. Department of Commerce located in principal cities of the U. S., Foreign Consulates of participating countries, and U. S. or foreign firms specilizing in market research abroad.)

Step 3. Organize Adequate Distribution Facilities and Representation

On the spot salesmanship is just as important abroad as it is in the U. S. To keep initial costs low and to start quickly, most companies begin by using existing U. S. export or foreign import firms. You can reduce red tape, be of real help to your customers abroad by making certain that your representatives have sufficient technical information about your products and enough training to enable them to write accurate specifications and make intelligent sales presentations.

(For detailed information on successful foreign distribution methods, consult "Channels for Foreign Trade" (U. S. Department of Commerce). Associates of the National Industrial Conference Board, 247 Park Avenue, New York 17, New York, may also refer to "Studies in Business Policy," Number 23, "Organization for Exporting"—1947.)

Step 4. Assure Acceptance for Your Products Among Governments Agencies

Lack of knowledge, at the government level, concerning your products, may cause them to be classified as non-essential. Such misunderstandings can be prevented by providing government officials and their advisors, at home and abroad, with expert technical advice and information.

(For information as to whom to contact in the United States or Foreign Government agencies, refer to Part II, Chapters 6 and 7, and Appendices D and E, of third edition of "How To Do Business Under The Marshall Plan." Include, on your mailing list, members of ECA missions in the capitals of Marshall Plan countries, and OEEC as well as ECA technical advisors and negotiators in Paris and Washington.)

Step 5. Interest the Foreign Buyer.

Contrary to general opinion, the primary point-of-sale for Marshall Plan business is not in Washington*, but with the business firms, trade associations and government agencies abroad which will use your products. Sales volume depends on the need for your products, their quality, and how well you sell them. That calls for the same sound steps you would take in the U. S.—informative advertising in established media, helpful product and technical literature, intelligent personal salesmanship, and adequate facilities for servicing.

*(*Secondary sales effort will, however, frequently include Foreign Missions in the U. S., and sometimes U. S. Government Agencies; see Part II, Chapter 6 in the third edition of "How To Do Business Under The Marshall Plan."*

If you contemplate advertising abroad you may find it helpful to study "Advertising—A New Weapon in the World-Wide Fight for Freedom," prepared by the Advertising Council, Inc., in consulation with the United States Information Service of the Department of State.)

And Make Sure You Do Business With Foreign Buyers of Standing in Their Own Country

ECA does not grant or lend money directly to private individuals, but extends cash or credit to their government. It is the responsibility of the foreign government to assign purchase authority and to arrange with ECA for one of several means by which payments can be made to you in dollars. The foreign buyer (unless the foreign government is itself a buyer) usually must pay his own government in local currency for your products. For these reasons, the buyer, just as under normal trade conditions, should be a responsible business man with good credit standing.

(For credit checks abroad use the same standard sources you employ in the U. S.)

Step 6. The Foreign Buyer Initiates Purchases

Before you can receive an ERP order, your customer abroad must have: advised his government of his general needs; ascertained whether these were included in the ECA approved plan for his country; selected and specified the type of product desired; informed his government; and requested a written sub-authorization bearing the ECA procurement authorization number. Only after the authorization of his own government has been secured, is he free to issue you a purchase order. This makes it important for you to keep your foreign propects fully advised about your products and their application through

appropriate advertising and personal salesmanship.

(Purchase orders may reach you; directly from your customers; through a foreign mission located in the United States; or, through a U. S. Government Agency, in the case of certain commodities and such areas as Greece, Trieste, Austria and Bizone Germany.)

Step 7. Make Sure the Foreign Buyer Can Obtain an Import Permit

The foreign buyer is responsible for securing import licenses from his own government at the time the order is placed, and for informing you as to the documentation required. It is good business, however, for you or your representatives on the spot to know the requirements and to see that they are met by the foreign buyer.

(Sources of information include the foreign government ministries and ECA missions located in the capitals of participating countries, and foreign government consulates located in this country.)

Step 8. Help the Foreign Buyer Obtain the Purchase Authorization

Your representatives should be sufficiently well informed on procedures as to be able to help your prospect in obtaining the written sub-authorization and ECA procurement from his own government.

(To insure prompt payment the ECA procurement authorization number must appear on all correspondence.) Purchase orders should also include:

a. Contract Date.

b. Quantity, description, source and dollar value of commodity or service.

c. Delivery basis and period.

d. Terms of payment.

e. Names and addresses of supplier, importer and commission agent or broker, if any.

f. If invoice value is subject to adjustment or not finally established, terms upon which final determination will be made must be stated.

g. When agreements relate to basic trade association contract forms or rules, such forms or rules should be furnished with the original purchase order or agreement.)

Step 9. Establish the Basis for Financing Your Contract and for Eventual Payment

Your order can be financed by your customers' government, a U. S. bank, or ECA itself. The ECA purchase authorization issued to your customer by his government should state which method will be used. The customer's government:

1. Advances dollars to your customer for direct payment to you.
2. Arranges for ECA to issue a letter of commitment to any U. S. bank.
3. Arranges for ECA to issue a letter of commitment directly to you.

The first two establish the basis for a normal commercial letter of credit. In the third, the letter of commitment is equivalent to a letter of credit, and may be discounted at your bank.

(Requests for Letters of Commitment (or credit) are initiated by the buyer and must be accompanied by standard commercial documentation and special ECA documentation outlined in ECA Regulation No. 1, as amended October 15, 1948. Refer also to Part II, Chapter 6, in the third edition of "How To Do Business Under the Marshall Plan.")

Step 10. Arrange for Necessary Export Licenses

ERP exports are subject to established export quotas and export license controls of the U. S. Department of Commerce. It is the responsibility of the actual shipper to meet such requirements.

(For information, contact any U. S. Department of Commerce field office, and ask for Comprehensive Export Schedule, Number 26, and subsequent bulletins.)

Step 11. Enter and Process the Order in Your Plant

Unless otherwise specified by the buyer, all ERP orders must meet customary manufacturing standards.

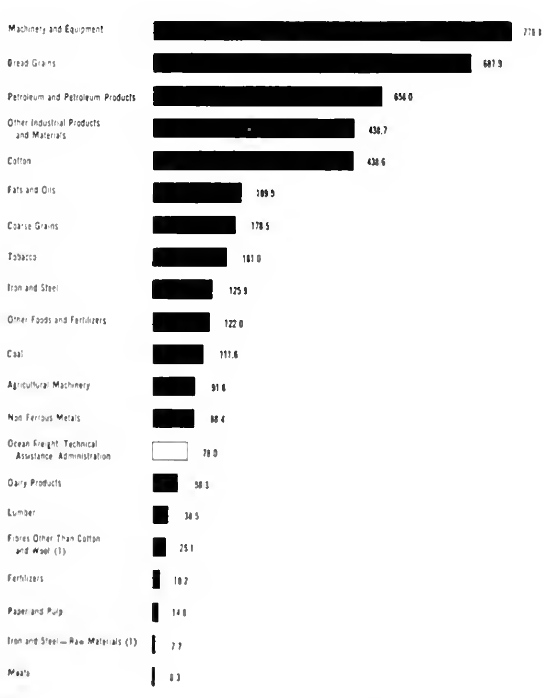
Goods must be stamped, branded, tagged, stenciled or lettered with the official ECA emblem, if practical, and in any case, containers must be so marked. In addition, shipping containers must bear the procurement authorization number and the country of destination —in characters at least equal in height to shipper's marks. The ECA emblem must be at least twice that height wherever practical.

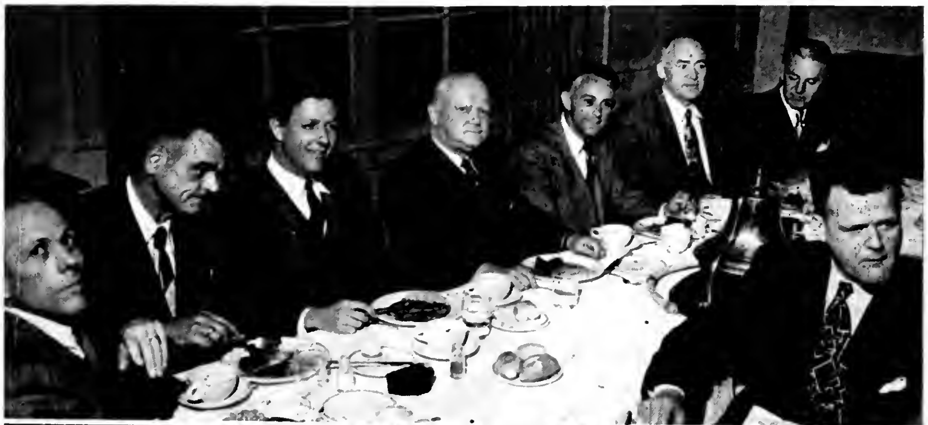
Step 12. Ship Goods FAS or FOB and Ask Your Bank to Arrange for Final Payment

Your bank will need to have the ECA documentation outlined in ECA Regulation No. 1 and may in addition need certain types of normal commercial documentations; for example, certificate of weights, certificate of

WHAT MARSHALL PLAN COUNTRIES HAVE REQUESTED FROM THE U. S. AND WHAT IS LIKELY TO BE AUTHORIZED BY ECA DURING 1949-50

(In Millions of Dollars)





P. E. Allan Speaks on Japan

P. E. Allan, vice president of the Tide Water Associated Oil, told the Jr. World Trade Association of San Francisco, at its May 4 meeting, how trade conditions are shaping up in Japan.

Top photo shows the head table.

Left to right: Frank Jacobs, Union Oil; Jack Farry, Associated Oil; Mel Freeman, Associated Oil; P. E. Allan; George Schmitz, Wells Fargo Bank, president of the Association; Dick Turner, Turner Associates;. Edwin Joseph Macfarlan, Standard Oil.

Lower picture shows a section of the membership in attendance.

inspection, and so forth.

Where such additional documentation is required, specific notation to this effect is normally shown on the procurement authorization involved.

(It is advisable to consult your bank before completing contracts. Your bank can be helpful in advising you as to the documentation which will eventually be required for final payment.)

Current World Trade Data

(Continued from page 71)

prior approval of the Controller of Foreign Exchange, but small sums up to the equivalent of Israeli Pounds 50 for the payment of books, magazines, etc., are permitted to be transferred. Imports and exports are subject to license control. Import license or exchange control permits normally include an undertaking on the part of the authorities to grant exchange. The bulk of imports are financed through letters of credit. Exporters who ship to Israel on a U. S. dollar documentary draft basis are legally obliged to accept a provisional deposit in Israeli pounds.

Japan

The Supreme Commander for the Allied Powers directed the Japanese Government to adopt an official exchange rate of 360 Japanese yen to one U. S. dollar, to be effective on April 25. This rate applies to all permitted foreign trade and exchange transactions, including all transactions for which the military conversion rate is now applicable. Rates for other currencies will be based on the official U. S. dollar values for such currencies.

For the time being, foreign trade and exchange transactions will be continued through the Japanese Board of Trade at the official rate and under the existing trade and control procedures.

Nicaragua

A new Law for the Stabilization of Exchange has recently been passed by the Nicaraguan Government. The decree follows very closely the recommendations of the Commission from the International Monetary Fund which visited Nicaragua.

The new law calls for a restricted policy in commercial credits, limiting loans to less than ninety days, without extension, and reducing new loans as much as possible. Prior authorization is necessary for any imports, which are classified into essential, semi-essential and non-essential. The list of products under each of these categories is expected to be published soon. Terms for all import authorizations will be sight draft, except in unusual circumstances, when the Commission may

authorize imports against letters of credit. No imports will be authorized with an importer's own funds or uncontrolled funds.

All permits will be valid for six months. Cordoba deposits against approved import permits will still be required in a proportion to be determined.

Paraguay

The Monetary Board of the Bank of Paraguay authorized the export of palm oil and castor oil on a compensation or barter basis. Only automobiles were excluded from the list of products which could be imported in exchange for these oils.

Economic Cooperation Administration

The Economic Cooperation Administration on May 3, 1949, revised its Regulation I to limit the prices paid for ECA-financed commodities and to simplify documenta-

(Please turn to page 91)

Foreign Trade Zone No. 4 — Los Angeles Harbor

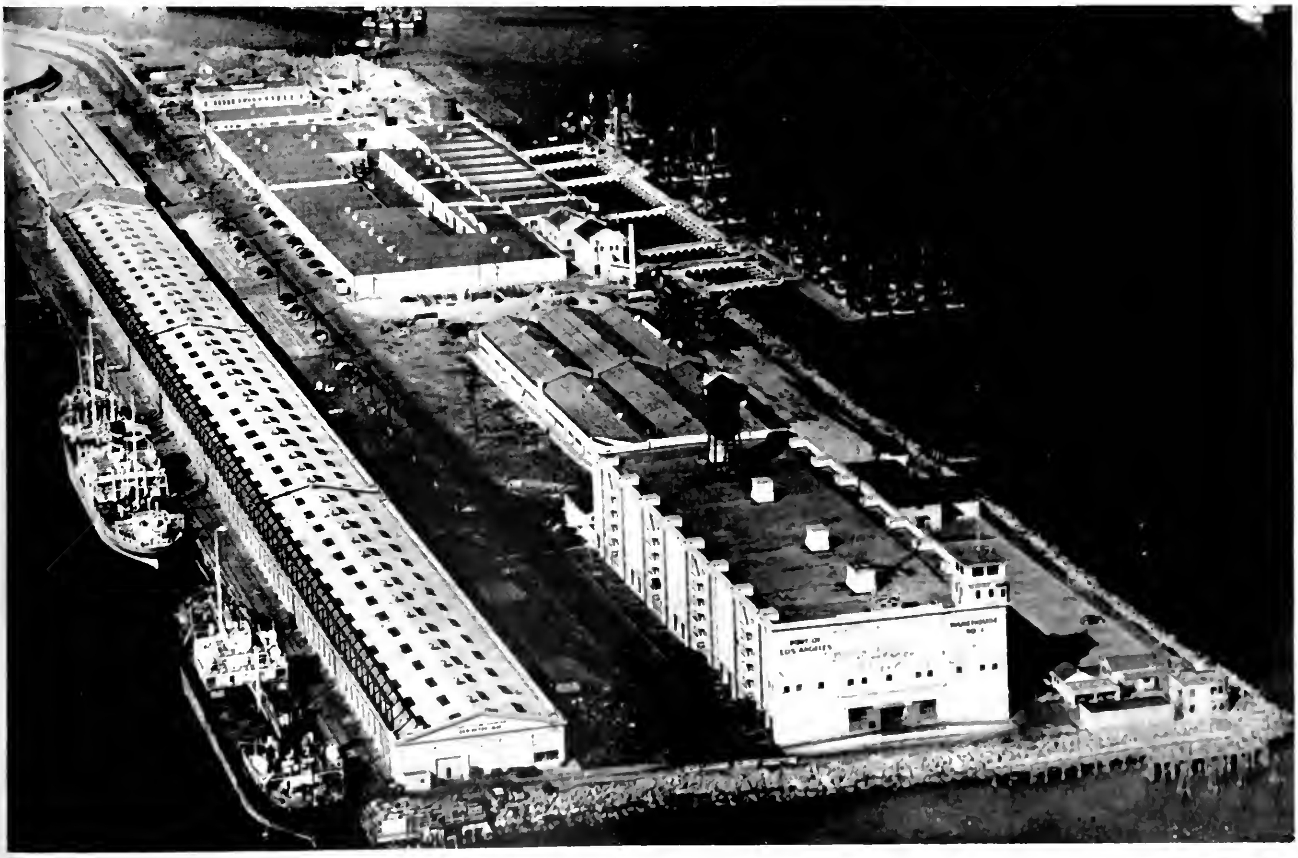
Charles Sawyer, Secretary of Commerce and Chairman of the Foreign Trade Zones Board, Washington, D. C., affixed his signature on May 21 to the Charter authorizing the establishment of Foreign Trade Zone No. 4 at Los Angeles Harbor. The Foreign Trade Zone, the fourth to be established in the United States, will be located in the outer San Pedro area, using a portion of Municipal Warehouse No. 1 and Berth 60.

According to General Manager Arthur Eldridge of the Los Angeles Harbor Department, the Zone will be in operation within a few months and contracts for the installation of required protective devices will be made and a tariff of charges will be adopted promptly.

This facility is primarily for the handling and storage of imported, dutiable merchandise and materials with a minimum of customs formalities. The Zone will be of incalculable benefit to importers in the area who have so vigorously supported the Los Angeles Harbor Department's application to have a Foreign Trade Zone established. Imports there totaled $150,000,000 during 1948, and the Zone in operation should materially increase the value and variety of essential goods from world markets.

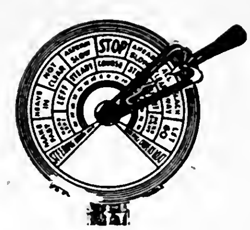
President C. S. Sampson, of the Los Angeles Harbor Commission, stated that the granting of the Charter was appropriately observed May 26 when a reception was held at the site of the Foreign Trade Zone, at which nearly 300 businessmen and county and city officials, participating in the annual World Trade Week visit to the port, took part.

Foreign Trade Zone No. 4



Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

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Finding the Position of Points Along a Great Circle Track

IN the past several years the "Skipper" has heard of various methods of Great Circle Sailing. Many of these are quite unique, and possibly accurate enough for practical purposes if certain requirements are met. A common one is the bending of a straight edge so that it forms an arc passing through the point of departure and the point of destination. This would work fairly well if the arc also passed through the vertex. There is no need of mentioning other unique methods. The purpose of this article is to try to show a rather simple method of accurately computing the position of points along a great circle track.

The use of the Great Circle Chart is good and accurate enough for all practical purposes. There is, however, the possibility of some inaccuracy in the transferring of positions from the Great Circle Chart to the Mercator Chart by the navigator.

For those navigators who like to compute the positions of points I offer the following formulas. First, it is necessary to compute for Initial Course. This may be done by any standard method of your choice. After the initial course has been determined these formulas may be used for finding the position of the vertex.

(1) $\dfrac{\text{Sine Lat. Departure}}{\text{Cot Initial Course}}$ equals Cot D.Lo. Vertex

(2) $\dfrac{\text{Cos D.Lo. Vertex}}{\text{Tan Lat. Departure}}$ equals Cot Lat. Vertex

(1) Log sine Lat. Departure minus log Cotangent of the initial course equals log Cotangent of the Difference of Long. to the Vertex.

(2) Log Cosine Difference Long. to Vertex minus log tangent of Lat. of Departure equals log Cotangent of Lat. of Vertex. By applying the Difference of Longitude to the Vertex as found in Formula (1) to the Longitude of the point of Departure the Longitude of the Vertex is determined thus giving you the position of the Vertex.

After determining the position of the Vertex, the position of any point along the Great Circle Track may be determined by the following formula:

$\dfrac{\text{Cosine of D.Lo. of Point from Vertex}}{\text{Cotangent of Lat. of Vertex}}$ equals Tangent of Lat. of Point

You may use any desired D.Lo. of Point from Vertex you choose. By applying the chosen Difference of Longitude to the Longitude of the Vertex you determine the Longitude of the point. Then by the above formula you determine the Latitude of the point.

Or if you desire to know at what Longitude your Great Circle Track will intersect a chosen parallel of Latitude you may use the following formula. (Cotangent of Lat. of Vertex multiplied by tangent of Chosen Lat. equals Cosine of D.Lo. from Vertex). By applying this D.Lo. to the Longitude of the vertex you determine the Longitude at which your Great Circle Track will intersect the chosen parallel of Latitude.

Problems such as this are best explained and illustrated in examples so let us take a Great Circle Track from Point Loma Light at San Diego to Nojima Zaki Light near Yokahama. The Position of Point Loma is Lat. 32° 40′ N., Long. 117° 15′ W.; and the position of Nojima Zaki Light, Lat. 34° 54′ N., Long. 139° 53′ E.

Having determined the initial course to be N. 54° 02′

WORK FORM					
Long. of Point W. of Vertex	175° 36.'5 W	179° 23.'5 E	174° 23.'5 E	169° 23.'5 E	164° 23.'5 E
Long. of Point E. of Vertex	165° 36.'5 W	160° 36.'5 W	155° 36.'5 W	150° 36.'5 W	145° 36.'5 W
Diff. of Long. from Vertex	5° 00′	10° 00′	15° 00′	20° 00′	25° 00′
Longitude of Vertex	170° 36.'5 W	170° 36.'5 W	170° 36.'5 W	170° 36.'5 W	170° 36.'5 W
Log. Cos. D. Lo. of Point	9.99834	9.99335	9.98494	9.97299	9.95728
— Log Cot. Lat. of Vertex	9.96887	9.96887	9.96887	9.96887	9.96887
= Log. Tan. Lat. of Point	10.02947	10.02448	10.01607	10.00412	9.98841
Latitude of Point	46° 56′ 34″ N	46° 36′ 50″ N	46° 03′ 36″ N	45° 16′ 19″ N	44° 14′ 07″ N

W. we may solve for the position of the Vertex as follows:

	Log sine Lat. Departure	9.73219
minus	Log Cot Initial Course	9.86073
	Log Cot D.Lo. to Vertex	9.87146
	D.Lo. to Vertex equals	53° 21′ 28″W
plus	Long. of Departure	117° 15′ W
	Long. of Vertex	170° 36′ 28″W
	Lat. of Vertex	47° 03′ 07″N.

Thus we solve the spherical triangle shown in sketch 1 and determine the position of the Vertex. With this data we are now able to solve for the position of points along the track as shown in sketch 2 using the formula as given before.

A sketch of the form which has proven quite satisfactory is shown with the solution for the points along the track. It is perhaps lengthier than is necessary in that a navigator does not usually need to write the application of five, ten or fifteen degrees Difference of Longitude to the Longitude of the Vertex in order to determine the Longitude of the Point but can do that part mentally. However, the form as shown would be the most foolproof and perhaps avoid an error.

It is well to remember that the Latitude of a point any chosen number of degrees of Longitude on one side of the vertex is the same as the Latitude of a point an equal number of degrees on the opposite side of the vertex. Keeping this in mind we can reduce the labor involved in computing the positions of points along the track as is shown in the formula. This would, of course, only hold true when the vertex lies between the point of departure and point of destination.

When the vertex lies beyond the point of destination we are not interested in the points along the track beyond our destination so in our computation for the Latitude of a point we use a Difference of Longitude sufficient to bring the point between our point of departure and point of destination. As an example let us suppose the vertex to lie 30° of Longitude past our destination. Instead of 5° Difference of Longitude as is shown in the first column of the accompanying form we would use 35°. Instead of 10° shown in the second column we would use 40° etc.

These formulas are all derived from "Napier's Rules of Circular Parts" for the solution of the right spherical triangle. Once the position of the vertex is known so that we have a right angle, various formulas can be developed for the solution of various problems concerning the great circle track.

To determine the course angle at any point along the track we could use the formula:

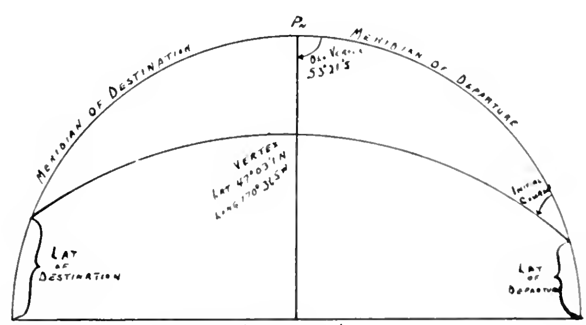
$$\frac{\text{Sine of Lat. of Point}}{\text{Cot of D.Lo. of Point from Vertex}} \text{ equals Cot. of course angle at that point.}$$

To determine the distance in miles of a point from the vertex we could use the formula:

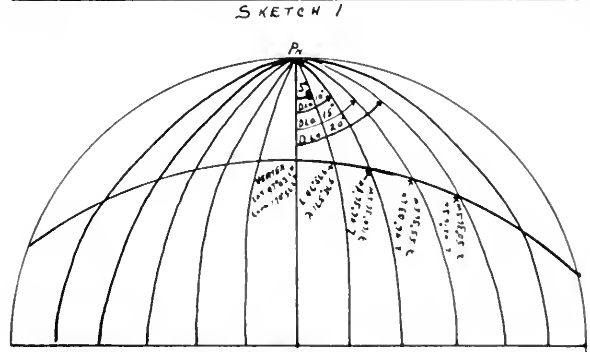
$$\frac{\text{Cos Lat. Vertex}}{\text{Cot. of D.Lo. of Point from Vertex}} \text{ equals Tan. of distance of point from vertex in arc.}$$

Convert the degrees of arc to miles by multiplying the degrees by 60 and add the minutes.

Formulas for any needs of Great Circle Sailing can be developed once the navigator has an understanding of the use of Napier's Rules and their application. In the opinion of this writer they are a very worthwhile study for the Navigator who is not familiar with them.



SKETCH 1



SKETCH 2

Port Engineers

Port Engineer of the Month

San Francisco

Adolph J. Ederer

Of Pacific Transport Lines

A native Oregonian, Adolph started to sea at the age of 18 as a wiper on the old *West O'Rowa* for Columbia Pacific Lines. Then he went to States Line, serving on the steamships *Kentucky* and *San Simeon* as First Assistant Engineer, and as Chief Engineer on the steamships *San Angelo, Washington, William H. Gray, Texas, John P. Jones* and *Colgate Victory*. He was Marine Installation Superintendent for Oregon Ship Building Corp. in 1941, working there until 1943 when he returned to sea for States Line. Ashore again in 1945 as Port Engineer for States Line in Long Beach, Adolph became Port Engineer of the newly formed Pacific Transport Lines in 1946.

Adolph J. Ederer

Harry F. Miller

Of Forster Shipbuilding Co.

San Pedro

A native of New York City, Harry F. Miller went to school in Passaic, N. J. He was only fourteen when he became a machinist at Mt. Holly (New Jersey) Iron Works where he worked for three years.

Harry served on several ships, including the *City of Los Angeles* as Assistant Engineer, both *City's of Honolulu,* ships of the Hammond Lumber Company and Standard Oil of California. He was licensed as Chief Engineer, steam and diesel, in 1933. He was a master mechanic at Midway Island from 1940 to 1942 and was at Pearl Harbor. In June 1942 he became supervisor of marine machinists at Bethlehem until 1945 when he became Port Engineer for Pacific Tankers where he remained until 1947. Quarterman at Todd's San Pedro yard for a while, Harry went from there to his present job as Sales Engineer for Forster Shipbuilding Co., Inc., Terminal Island.

Harry F. Miller

News Flashes

THREE MOTOR LINERS FOR DE LA RAMA ORDERED IN JAPAN

Orders for three Pacific passenger-cargo ships have just been placed with the Mitsubishi yards at Nagasaki, Japan, by the De La Rama Steamship Co., which operates between United States ports and the Far East.

The liners will be of 10,000 gross tons each, 465 feet long, 64 feet 6 inches in beam and 41 feet deep. They will be twin-screw motorships driven by 10,660 horsepower diesels.

* * * * *

CARRIER CONVERSION AT SAN FRANCISCO

The Aircraft Carrier CABOT is scheduled for a conversion job at San Francisco Naval Shipyard this Fall. It will be an 8 month job.

* * * * *

TODD WILL HANDLE TUNA BOATS

Todd Shipyards Corporation, with yards at San Francisco, Seattle and San Pedro, has announced that its facilities are now available for the accommodation of operators of fishing boats in the repair of fishing vessels along the entire Pacific Coast.

* * * * *

UNION OIL COMPANY MAY BUILD TANKER

Inquiries among manufacturers indicate that Union Oil Company is planning construction of at least one tanker, the particulars of which would seem to be 500 ft. length, 16,500 deadweight tonnage, 8500 turbo-electric horsepower. M. J. Ryan is the naval architect.

* * * * *

AIR FORCE PROCUREMENT CONTRACTS

Large and small manufacturers in the Bay Area may submit bids for Air Force Procurement Contracts to carry out the construction program of the nation's expanding Air Force. All inquiries concerning the Air Forces Procurement Program should be addressed to: United States Air Force, Officer-in-Charge, Aircraft Engineering and Maintenance Company, Oakland Municipal Airport, Oakland 14, Attention A. P. Burleaud, Production Expeditor, or telephone LOckhaven 9-3223, Extension 175.

NEW DELTA LINER

A construction subsidy for a new $12 million passenger-cargo vessel for the Mississippi Shipping Co. (Delta Line) has been approved by USMC. The new vessel, which will accommodate 234 passengers, will be larger than any of the line's present ships.

* * * * *

REPAIRS TO LAY-UP FLEET

The 25 million dollar appropriation now under debate in a Congressional Committee for repairs to the lay-up fleet will include about 53 vessels on the Pacific Coast. Of these, 9 are at Olympia, 10 at Astoria and 34 at Suisun. Included are C-4's, C-2's and Victorys.

* * * * *

NAVY RESTORING MOTHBALL DESTROYERS

The first division of destroyers to be demothballed on the Pacific Coast since the war, left San Diego for San Francisco June 13.

* * * * *

CARRIER ESSEX TO BE MODERNIZED

A 22 million dollar modernization job on the big U.S.S. ESSEX, now in the inactive fleet, is announced from Bremerton, Wash. The Navy yard which will perform the work has not been selected.

* * * * *

BASING POINT LEGISLATION IN PROSPECT

The Senate has unanimously passed a bill legalizing non-collusive freight absorption. If the Bill is finally passed, the recent restrictions on the pricing of steel, cement and salt will be eliminated.

* * * * *

50-50 ECA DIVISION WILL REQUIRE MORE SHIPS

The Tonnage distribution among American and foreign flag ships in the ECA program has dropped to about 30 percent. The law requiring a 50-50 division will require many vessels to be withdrawn from the lay-up fleets immediately.

* * * * *

NAVY COMBAT VESSELS IN PACIFIC

Distribution of combat Navy ships will result in the following assigned to the Pacific after June 1950.

2 large carriers

3 small & escort carriers

6 cruisers

53 destroyers & destroyer escorts

32 submarines

28 amphibious craft

38 patrol craft

123 auxiliaries

Admiralty Decisions

By HAROLD S. DOBBS of San Francisco Bar

An Unusual Deportation Case

An interesting decision that I came across recently proves that the old adage "It isn't what you know but whom you know," may have been restated and reinterpreted to mean "It isn't whom you know but where you can go to live when nobody wants you."

In the case of *John Stanieszewski* v. *the District Director of the United States Immigration and Naturalization Service,* decided by the District Court of the Southern District of New York, the court was faced with the problem of determining the validity of the exclusion order issued by the District Director of the United States Immigration and Naturalization Service in which the petitioner, Mr. Stanieszewski, was ordered excluded as an inadmissible alien. The Commissioner's exclusion order was based upon a report of a special board of inquiry which was later affirmed on appeal by the Board of Immigration Appeals. The petitioner applied for and obtained a writ of habeas corpus in March of this year, in which he sought a review of the cause of his detention on Ellis Island by the Director of Immigration.

The Board of Special Inquiry, mentioned above, found that under the pertinent section of the Immigration Act of 1924, the petitioner was inadmissible to the United States because he was an immigrant without an immigration visa, and not within the exemptions provided under the Act. They also found that under the Passport Act of 1918, the petitioner was inadmissible because he was unable to present an unexpired passport or official document in the nature of a passport issued by the government of the country to which he owed allegiance. They also found that under another pertinent section of the Immigration Act of 1917, the appellant was inadmissible because he had been convicted of a crime involving moral turpitude, to wit: perjury, which he had fully and freely admitted. Under the Act of 1929, the Board found the petitioner inadmissible on the ground that he was an alien who had been arrested and deported in pursuance of law, and to whom the proper authority had failed to grant permission to reapply for admission.

The petitioner was employed aboard vessels operated by the United States Lines and the manager of the Unlicensed Personnel Department of the aforesaid operator submitted an affidavit "amicus curiae," from which the following is pertinent:

"3. On ar about April 23, 1947 the petitioner herein became a member of the crew of the S.S. *JOHN J. CRITTENDEN* at Norfolk, Virginia, for a voyage to Bordeaux, France, and return to the United States under articles by which he was entitled to be paid off at the end of the voyage. The petitioner served aboard said vessel as a seaman until on or about June 4, 1947, when he was granted shore leave by the Immigration Service and was paid off and discharged from that vessel.

"4. On or about July 14, 1947 the petitioner herein became a member of the crew of the S.S. *CRAWFORD W. LONG* at New York, N. Y., for a voyage to one or more European ports and return to the United States under articles which provided for his discharge on the termination of the voyage. On the return of that voyage at New York he was ordered detained on board by an Immigration Inspector, whereupon he proceeded aboard the vessel as a seaman to the port of Cherbourg for return to Baltimore, Maryland. On arrival at Baltimore on or about October 10, 1947, he was again ordered detained aboard the vessel by an Immigration Inspector at Baltimore, and being unable to obtain a release from said detention order he was on or about October 15, 1947 removed to the Immigration Station at Ellis Island, New York, for safekeeping, where he has since been detained at the expense of the United States Lines Company at the rate of $3. per day.

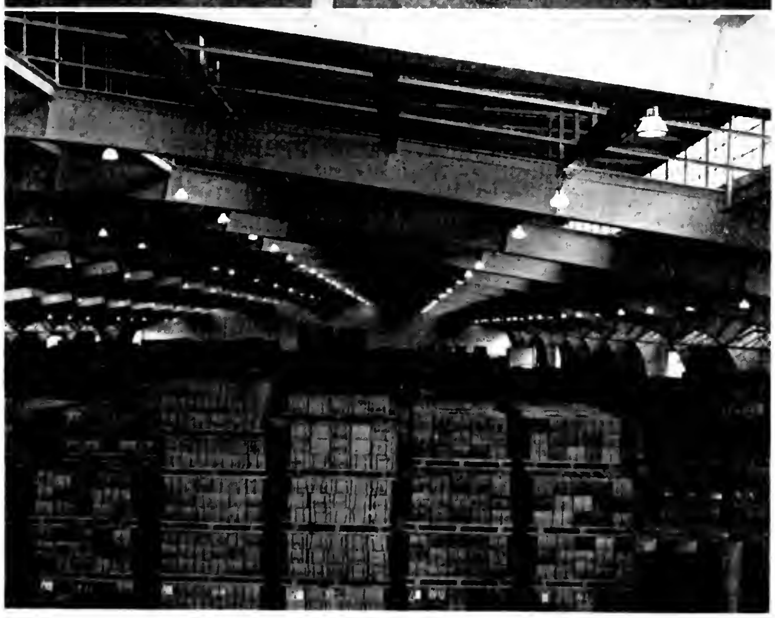
"5. On information and belief, the petitioner has claimed a residence in the United States since 1911, pursuing his calling as a seaman. When he became a member of the crew of the vessels heretofore mentioned, he was in the United States and, if his residence therein was in any respect illegal United States Lines Company was not advised of that fact. He was furnished to the United States Lines Company in the regular way by his Union. He had in his possession at all times adequate seaman's papers issued by the United States Coast Guard for service on American ships, and the crew list which contained the name of the petitioner was duly submitted to the Immigration Service prior to departure. He was also signed on as a member of the crew by the United States Shipping Commissioner at New York. The operator of an American vessel has no alternative but to accept seamen designated by an accredited Seamen's Union whose seaman's papers are in order, unless its own records contain information on which it can be established that the tendered seaman is for some reason not a qualified or desirable seaman. The records of the United States Lines Company did not contain anything derogatory to the petitioner in that respect. * * *

"7. The position of the United States Lines Company is that the Immigration Laws do not contemplate the right of the Immigration Service to effect the deportation of an alien seaman from the United States in the guise of ordering him detained and deported, if he is a bona fide seaman and in possession of appropriate seaman's papers issued by the United States Coast Guard when he is accepted for employment in the United States under articles that provide for a round voyage and return to a port in the United States to be paid off and discharged. If the Immigration Service is permitted to refuse shore leave in such circumstances, the result is that the seaman may in effect be imprisoned for life at the expense of the steamship owner, because except in the rare instance that the vessel might happen to proceed to a country of the seaman's nationality, it probably would be found impossible for him to go ashore and remain in any other country. In the present instance the petitioner has made two round trips without being able to land, and has been held in forcible detention for about 6 months at the expense of the vessel on which he served, without any fault of the vessel or its owners. In many instances the circumstances are even more aggravating."

Because of the peculiar circumstances involved, the court, in considering the writ of habeas corpus, suggested that all interested parties make an effort to arrange to have the petitioner shipped out to some country that would receive him as a resident. Although he was a

(Please turn to page 94)

Running Lights



Long Beach Transit Shed

The giant new transit shed at the Port of Long Beach is already proving its value in the commerce of that port. It is one of the finest transit sheds ever constructed. With 5⅓ acres of floor space, the shed offers flexibility to traffic and well ventilated spaces above the stacked cargo. The interior is 1152 ft. long and 200 ft. wide with a ceiling height of 24 ft. at the side and 43 ft. at the center. The clearance at the center is 33 ft. to the rigid frame. There are 1422 steel framed windows, 358 inside flood lights and 134 outside flood lights. Fifty-eight side doors provide convenient access from any spot along the apron which is 51 ft. 8 in. wide. Fire protection is provided by 3510 automatic sprinkler heads.

The shed cost $1,500,000 and required 2400 tons of steel, 2600 cu. yards of concrete and 10,000 gal. of paint.

◄

Port of Long Beach Pier A, Berths 6 and 7. This pier is 1152 ft. long and 200 ft. wide.

Photo shows the lighting and ventilation as cargo is moved in.

John J. Walsh

Walsh Appointed a Director of Furness

John J. Walsh, in charge of operations, has been appointed a Local Director of Furness Withy & Co., Ltd., with headquarters at Furness House, New York.

For many years Senior Representative of the company on the Pacific Coast with headquarters in San Francisco, Walsh accepted the position of General Manager in the New York organization a few years ago.

Haviside Distributor for Baldt Anchor

The Baldt Anchor, Chain & Forge Division of The Boston Metals Company, Chester, Pennsylvania, has announced that Haviside Company of San Francisco, California, will act as their exclusive sales representative and distributor for the states of California, Oregon and Washington.

The Haviside Company will carry a substantial stock of Baldt material in the popular sizes and provide immediate deliveries.

Di-Lok Chain is a development of the U. S. Navy in the Boston Navy Yard. Prior to World War I, practically all of the chain used for ships, including the U. S. Navy, was wrought iron, and that supplied for Navy ships was manufactured in the Boston Navy Yard. The War requirements taxed chain manufacturing facilities, with the result that outside interests developed and manufactured cast steel chain which was a development of ordinary foundry practice of pouring molten metal into preformed molds and this chain not only supplemented wrought iron chain but was considered stronger and its use was adopted by the U. S. Navy.

As a result of this natural development, authorities at the Boston Navy Yard began a program of research and development on anchor chain and developed Di-Lok Forged Steel Chain.

The Baldt Company acquired the exclusive rights of manufacture for commercial use and became an auxiliary supply to U. S. Navy. Therefore, this chain is forged under patents originating in the Boston Navy Yard from high tensile steel bars with the stud forged as an integral part of each link which cannot break, work loose or fall out.

Baldt Anchors were manufactured on the West Coast by Columbia Steel Company under patent rights until that company recently discontinued manufacturing finished castings. These anchors will now be manufactured by the Baldt Company and shipped to the West Coast for use.

The 65 large vessels (oil tankers, passenger and cargo vessels), under construction or under contract as of March 1, 1949. in the United States are being equipped with Baldt Anchors, and 80% are being equipped with Baldt Di-Lok Forged Steel Chain.

Included in these vessels are three large passenger cargo vessels contracted by the American President Lines of San Francisco to the New York Shipbuilding Corporation. These ships will carry two 13,370 lb. Bower Anchors, one 11,340 lb. Spare Anchor and one 4,795 lb. Stream Anchor. All of these will be of the Baldt Stockless Type. They will also be equipped with twenty-two 15 fathom lengths of $2\frac{7}{16}$″ Di-Lok Chain; the stream anchor will be equipped with seven 15 fathom pieces of $1\frac{3}{8}$″ Di-Lok Chain.

The larger of the super tankers under construction will use two 16,345 lb. Bower Anchors, one 13,895 lb. Bower Anchor, Spare, and one 5,915 lb. Stream Anchor. These likewise will be of the Baldt Stockless Type. The complement of chain on these super tankers is twenty-two 15 fathom lengths of $2\frac{11}{16}$″ Di-Lok Forged Steel Stud Link.

Ralph W. Hewett, Manager of Haviside Company, will be in charge of coastwide distribution of these products. His experience in this field will ensure prompt and efficient service to the requirements of each purchaser. And it is believed that the association of these two long established and widely known firms will prove advantageous to shipping interests on the Pacific Coast.

Worthington Appoints West Coast Dealers

The Worthington Pump and Machinery Corporation has appointed three dealers on the West Coast specifically for the Marine Trade.

These are J. M. Costello Supply Co., Wilmington; Anchor Equipment Company, Pier 3, San Francisco; and Mar-Dustrial in Pacific Northwest.

Each of these has a staff of Sales Engineers and a stock of complete machines and repair parts designed to supplement Worthington's own activities in these areas in order to better serve the Marine Industry.

Coastwise Painters Expands Operations

The old established firm of Coastwide Painters, which has specialized in ships' painting for many years, was recently reorganized under the name of Coastwide Painters & Decorators. The new firm, under the management of Leslie L. White, has expanded its field of operations to include all types of commercial and residential painting in addition to ships' painting. The paint shop and offices are located at 500 Jefferson St., San Francisco. The shop is completely stocked with gear and tools to handle all kinds and sizes of paint jobs.

A veteran of the Bay Area waterfront, White was associated with the Matson Line for 21 years. He is assisted by Ben Price who is Painting Superintendent. Price has been superintendent for major painting concerns for 25 years. Office Manager is Bredo Mathisen who has been associated with the shipping business for 17 years, and in the last few years has been on the administrative end of ships and industrial painting. Dan P. Maher, Jr., is a junior executive.

Left to right: Bredo Mathisen, office manager of Coastwide Painters, Inc.; Ben Price, superintendent; Leslie L.

Aluminum Small Craft

Aluminum alloys are proving highly successful as the structural material for all types of pleasure craft, from tiny dinghies to 20-foot cruisers. Representative of the rapid growth of the business is the Trailorboat Engineering Company of San Rafael, California.

The original "Trailorboat" is literally just that. It includes a built-in single wheel that makes a one-wheel trailer of the boat. The hull of the boat is made of sheet aluminum. Two sheets, cut to pattern, are riveted together to make the entire outside with the exception of the stern. A third section is riveted in place to complete the structure. Moisture is excluded from between the faying surfaces of the sheet metal and the hull is effectively sealed by the application of a compound known as "Alumilastic" just before riveting. Vibration, a point of criticism in many metal craft, is deadened in the "Trailorboat" by the use of wood in gunwales and in the transome boards.

There has always been considerable controversy regarding the use of unpainted aluminum alloys in marine applications. Corrosion, however, has been found to be a negligible factor by everyone who has made such small craft with these alloys. The secret seems to be in the selection of the proper alloy for the job. Aluminum alloys containing magnesium have been found to possess corrosion resistance of the highest caliber when in contact with salt water.

Such an alloy is the Alcoa 52S used in the construction of the "Trailorboat." This material is non-heat treatable and is purchased for this application in the half-hard condition. The temper is controlled by the degree to which the metal is work hardened at the rolling mills. The 52S½H, as it is designated, possesses sufficient rigidity to give a sturdy hull but is still yielding enough to be worked without preforming the sheets to shape. Thus the "Trailerboat" is made simply by cutting out the flat sheets to template and holding them to shape until firmly riveted in place. Metal thickness is .040" throughout. Rivets of 2S (commercially pure) aluminum are generally used, although 53ST61 alloy rivets are chosen where shear strength is important.

Trailorboat Engineering Company was organized by three men just a little over a year ago. Ralph Cain and two Lenci brothers designed the first model and set up shop at 609 Francisco Blvd. in San Rafael on San Francisco Bay. In the first year of operation, they built an average of seven boats a day. By this summer they hope to hit a peak of 35. In the meantime they have added six more stock models, all built by the same production methods. Current favorite of the "Trailorboat" fleet is the "Fun-A-Bout," selling for less than $300 and re-

1. Assembling hull. Aluminum sheet stock is not preformed. Cut to pattern, sheets are held in position by Cleco clamps and riveted directly.

2. Gunwales, seats and heavy stern board (to hold outboard motor) are fabricated of wood in this model.

General view of assembly plant.

portedly a good deal speedier than many craft costing ten times as much.

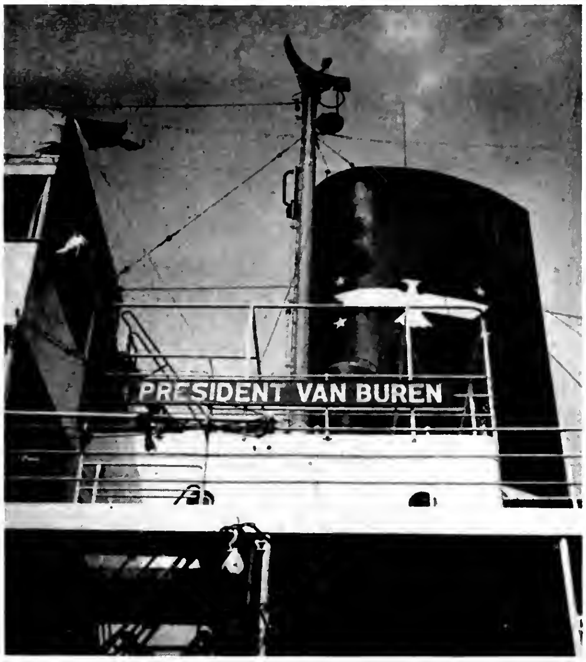
The outstanding qualities of aluminum alloys in such applications are the corrosion resistance already discussed and, of course, the exceptionally light weight. Other features that bid fair to make this type of craft more and more popular are the minimizing of maintenance and the all-weather type of construction that makes covering the boat quite unnecessary. The aluminum alloy boat is not painted in the first place and requires, therefore, neither scraping nor painting thereafter. Truly a boom to the occasional user who wants his boat for fun without a lot of fuss!

R. E. Duffy Marine Manager for Groves

Frank Groves, president of the Frank Groves Company, 144 Spear Street, San Francisco, announces that R. E. "Bob" Duffy has been appointed Marine Manager of the organization. Duffy succeeds Dan Smith who has been appointed Chief Order Clerk in the San Francisco office. Graham Smith heads the Frank Groves Refractory Division.

Left to right: Frank Groves, Bob Duffy and Graham Smith.

The Mackay Installations on "President Van Buren"



Raytheon Radar Antenna

Top: Mariner's Pathfinder Radar Indicator made by Raytheon, installed by Mackay Radio. 1-2-4-8-20-40 mile radius. Bottom: Mackay Radio MRV 10/11. Marine Radio. All-in-one unit.

Latest addition to American President Lines' fast grow- fleet of speedy, modern C-3 freighters operating in the Company's various global services, the S. S. *President Van Buren* (pictured below) and her two sisterships, the *President Johnson* and *President Harrison,* were acquired from the Hudson River lay-up fleet and given extensive conversion to outfit them specially for APL's trade routes.

Shown on this page are the Mackay installations on the *President Van Buren.*

Port of Seattle Greets Commissioners

David G. Coddaire, member of the United States Maritime Commission, and Captain M. F. Dineen, Chief of Fleet Operations, Branch of the U.S.M.C., were guests of the Seattle Port Commission at a luncheon held at the Olympic Hotel May 11.

Commissioner Coddaire and Captain Dineen were in Seattle on one leg of their tour of Pacific Coast port and harbor installations. While in Seattle they discussed maritime problems with representatives of all branches of the shipping industry.

Present at the luncheon besides Commissioner Coddaire and Captain Dineen were J. A. Earley, president of the Seattle Port Commission; Commissioners E. H. Savage and Gordon Rowe; Col. Warren D. Lamport, general manager of the Port of Seattle, and Tom M. Alderson, Port of Seattle attorney.

The luncheon was given by the Seattle Port Commission as an expression of appreciation of the generous assistance and understanding given by Commissioner Coddaire and the U. S. Maritime Commission to problems of the Port of Seattle.

Top Row, left to right: E. H. Savage, Port of Seattle commissioner; Tom M. Alderson, Port of Seattle attorney; Gordon Rowe, Port of Seattle Commissioner; Col. Warren D. Lamport, general manager, Port of Seattle.

Bottom Row, left to right: David G. Coddaire, United States Maritime Commissioner; Capt. M. F. Dineen, Chief, Fleet Operations Branch, USMC; J. A. Earley, president, Seattle Port Commission.

Garlock Packing Holds Educational Meeting

A joint sales meeting of the Los Angeles and San Francisco branches of the Garlock Packing Company was held at the St. Francis Hotel, San Francisco, on April 25th. It was attended by the district managers, office managers and entire sales force of both branches, and presided over by President George L. Abbott, Vice President in charge of Production C. R. Hubbard, and Vice President in charge of Sales Phil Arnold.

Starting at right foreground and continuing around the table: R. J. Young, Los Angeles representative; J. W. Boerner, San Francisco representative; E. H. Ostrander, Office Manager, San Francisco; J. W. Brennan, Portland representative; Ruth Bolla, San Francisco office; D. F. Scholl, Seattle representative; R. M. Seeley, Eugene, Oregon representative; R. O. Krohm, San Francisco office; R. A. Mathewson, San Francisco office; M. G. Quick, San Francisco factory; C. W. Harmon, District Manager, Los Angeles; Helen Lumb, San Francisco office; E. A. Tolley, District Manager, San Francisco; Geo. L. Abbott, President, The Garlock Packing Company, Palmyra, N. Y. (head office); C. R. Hubbard, Vice President in charge of Production, Palmyra, N. Y.; Alice Druskin, San Francisco office; B. R. Moncla, San Francisco office; Phil Arnold, Vice President in charge of Sales, Cleveland, O.; Erma Penna, San Francisco office; N. Fogal, Los Angeles representative; L. O. Berns, Los Angeles representative; Fay Elliott, San Francisco office; K. C. Allen, Tacoma representative; R. S. Parker, Far Eastern representative; H. F. Buckley, San Francisco representative; E. S. Walker, Office Manager, Los Angeles; D. J. Kindschy, Spokane representative; R. Vanzetti, San Francisco factory; R. L. Waters, San Francisco representative; Z. E. Webb, San Francisco office; Jacquiline Viramonte, S. F. office; T. G. Kenney, San Francisco representative; W. J. Leach, Los Angeles representative.

By CARL JOHNSON
Consulting Engineer

SPARE PARTS

As known, spare parts have always been a main item on diesel powered ships. There shou'd always be enough of these aboard and they should fit when they have to be used. We often run into difficulty with spare parts that do not fit when we try to install them. In that case they have to be taken off the ship to a machine shop. Sometimes they can be remachined and fixed up; other times they will go in the junk pile.

Some engineers have a habit of repairing and patching up defective parts to keep aboard as spares, not realizing that the cost of labor and time patching same will be higher than if a new part had been made. If too many patched up parts get into an engine, your worry will start, and it wi:l take a lot of work to get an engine back in shape after it once gets the best of you.

If help is needed from a ship repair shop, be sure to get some people that know and are familiar with the engine and realize that the ship has to go to sea with a limited amount of men to operate it. Many of the old timers have at one time or another been putting in !ong hours to get the engines to make the next port, because the repair shop that worked on the engine when the ship was in port was not familiar with them.

E. Russell Lutz Joins W. R. Grace & Co. — Shiner Goes to Los Angeles — St. Amant to New York

E. Russell Lutz, until recently Vice President for Foreign Administration and for a time acting president of the American President Lines, has joined the staff of W. R. Grace & Co., international industrial and trading company. He will be Manager of the Washington, D. C., office of the Grace organization.

Before entering business, Lutz, an attorney, had been in government service. From 1926 to 1937 he was with the Department of State, first as Assistant Solicitor, then Assistant Legal Adviser, serving under Secretarys Kellogg, Stimson, and Hull. From 1937 to 1941, Lutz was associated with the Maritime Commission, and from 1939 to 1941 was its Assistant General Counsel.

Lutz has served as a member of the Board of Directors of the National Federation of American Shipping, the American Bureau of Shipping and the Policy Advisory Board of the Pacific-American Steamship Association, of which he was also president.

R. A. Shiner, now in the Washington office, will go to Los Angeles as Manager of Grace Line's office in that city. Shiner has been with the Grace organization for more than fourteen years. He has been Assistant Passenger Traffic Manager, in New York, and Manager of Grace Line's activities in Washington.

William A. St Amant, at present Manager of the Los Angeles office of Grace Line, will go to that Company's headquarters in New York where he will shortly assume additional responsibilities. He has been with Grace for twenty-two years, and has been Manager of the Los Angeles office since 1944.

E. Russell Lutz

Westinghouse Names New Manager for Southern California

Stanley M. Johns, native of Los Angeles and recently manager of the Salt Lake City office for the Westinghouse Electric Corporation, has been named manager for Westinghouse in the Southern California area.

Stanley M. Johns

Johns succeeds Walter G. Willson, Westinghouse manager at Los Angeles since 1943, who for reasons of health has requested and been granted a transfer to Phoenix, Ariz., as manager there.

A man of wide experience in all phases of the electrical industry, Johns joined Westinghouse as a graduate student in 1926 at East Pittsburgh, Pa., later being assigned to the company's office at St. Louis, Mo., as an electrical application engineer. In 1933 he joined the staff of one of Southern California's utilities, and in 1941 rejoined Westinghouse and was transferred to the Salt Lake City office. He became manager there in 1944.

Imhof Advanced By Weeks-Howe-Emerson

J. J. Imhof, who has been with Weeks - Howe - Emerson Company for more than a quarter of a century, was elected a Director at the annual stockholders meeting, May 23.

Current World Trade Data

(Continued from page 75)

tion procedures.

The price revision fixes separate rules for purchases in the United States, for purchases offshore, and for purchases of certain listed food and agricultural commodities. In general, the amendment provides that, for purchases in the United States, ECA will not finance the payment of a price which exceeds the supplier's price in a comparable domestic sale adjusted by his export differential.

American Consuls Not to Certify Consular Invoices for "Intransit" Shipments

The Department of State has recently received some inquiries from American consular officers as to the propriety of their certifying, upon specific request, American consular invoices in connection with shipments coming to the United States in transit to foreign countries, as distinguished from bona fide import shipments. The Department's reply to these inquiries has been that officers should refrain from certifying American consular invoices for "intransit" shipments, on the ground that no United States importation is intended at the time of shipment of the merchandise.

Consequently, when United States firms are interested in shipments of goods in transit through the United States to third countries, they should refrain from stipulating the presentation of a consular invoice as a condition to the payment of a letter of credit, since, in cases of this nature, such an invoice cannot properly be certified by an American consular officer.

Export Credit Information on Latin American Countries

The following is an excerpt from a release of the Federal Reserve Bank of New York, dated March 15, 1949:

"During March there was no clear-cut change in the trend of Latin American export collections, as reported by twelve New York City banks.

"Of the individual Latin American countries, 15 showed increases in the dollar amount of collection items not yet paid. The largest increase, about $8,500,000, occurred in Brazil, where the amount of draft collection indebtedness at the end of March was only slightly below the record high level of May 1948, and some further decline occurred in the proportion of drafts paid promptly.

"Argentina made dollars available for payment of only 22 collection items during the month."

Latin American Exchange Situation

The Office of International Trade of the U. S. Department of Commerce published a survey of foreign exchange conditions in the following Latin American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Nicaragua, Paraguay and Uruguay.

The brochure, which should be of great interest to exporters, can be obtained from the Regional Office of the U. S. Department of Commerce.

Thanks Exchanged

Tim Mullen of American President Lines and Gene Blank of Pope & Talbot express simultaneous "thanks" at the annual meeting of the Port Stewards Association. Tim is saying thanks for the sentiment and brief-case gift order, and Gene expresses the gratiude of the club for a successful year under Tim's leadership. The meeting was held at Fred (Rudy De Gorog) Solari's.

New Revere Mill

Street-side view of the rod and tube mill recently completed in the central manufacturing district of Los Angeles by Revere Copper and Brass Incorporated. Nucleus of Revere's Pacific Coast Division, it was formally opened on April 18, 1949, on the 174th anniversary of Paul Revere's historic ride.

Tuggy Named General Freight Agent For Coastwise

Robert Tuggy

Robert Tuggy of San Francisco has been named to the newly created position of General Freight Agent for Coastwise Line.

An outstanding figure in freight forwarding circles for the past 20 years, Tuggy was formerly Pacific Coast Manager of Wells Fargo Carloading Company; Manager of International Forwarding Company and Pacific Coast Manager of National Carloading Corp. He is currently president of the Pacific Traffic Association, a member of the San Francisco Transportation Club, Oakland Traffic Club, San Francisco Press Club and Islam Shrine Temple.

Worthington Elects Marshall Secretary

At a meeting of the Board of Directors of Worthington Pump and Machinery Corporation held May 18, Robert E. Marshall was elected Secretary of the Corporation, succeeding the late C. Neal Barney.

Marshall, a graduate of Amherst College and Harvard Law School, was admitted to the New York Bar in 1937 and to the New Jersey Bar in 1942 and has been associated with the Corporation since 1947, serving as a member of the Legal Department, Counselor on Industrial Relations, and Assistant Secretary.

Marshall's headquarters will be at the Corporation's New York offices at 2 Park Avenue.

Robert E. Marshall

H. B. Haney

Haney is Vice-President

H. B. Haney has been appointed a Vice President of Tide Water Associated Oil Company. He has long service as an Assistant Vice President.

As Manager of Transportation of the Western Division, Haney is in charge of all marine, pipe line, traffic, automotive and telephone and telegraph activities of that division. He is well-known in Western transportation circles, and has held many important transportation assignments during his years with Associated.

Prototype Cargo Vessel

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of three 300 KW sets, any two of which will be capable of carrying the normal sea load of the vessel.

Diesel Alternate

Possible alternate installations of geared diesel or other types of main propulsion units have been considered in the arrangement of engine room main transverse watertight bulkheads. If necessary, the forward engine room bulkhead may be shifted forward up to three frame spaces to provide space for larger machinery plants. Although loss of cargo cubic unavoidably results therefrom, the subdivision standard is not impaired.

Casings above the Second Deck have been proportioned to accommodate the largest machinery installation without change, thus enabling a single standard arrangement of deckhouse regardless of type of main propulsion machinery installed.

A pipe tunnel will be provided in the Inner Bottom under the deep tanks in No. 3 hold.

Two double effect low pressure combined evaporator distiller units, each having a normal capacity of 8000 gallons per 24 hours, will make the vessel self sufficient as to fresh water requirements. The ship will be equipped with a complete domestic fresh water combined system for washing and potable water.

Two steel accommodation ladders will be provided having a top swivel platform, feathering treads and rails and dock side rollers.

Ground tackle equipment will be furnished in accordance with the requirements of the rules of the American Bureau and an equipment numeral of C—41. Cable will be forged steel, stream line and towline will be wire rope and hawsers and wraps will be manila.

Two 28′—0″ x 9′—9½″, 66 person, hand propelled life boats will be installed, as shown on plans, in gravity type davits.

The commissary spaces are arranged to provide a complete messing service adequate in every respect for the convenient and proper service of the full complement of the vessel with equipment of the latest, most approved type for the service to be rendered. Galley ranges will be fully automatic, electric.

Six large staterooms accommodate 12 passengers on the boat deck. The entire complement of passengers, officers, and crew are quartered in the midship house all with comfortable outside rooms. In no case are there more than three crew berthed in one room. All bulkheads separating the rooms and other joiner work therein are of incombustible type, as are the furniture in crew's and passenger quarters. This feature complies with Senate Report 184 and exceeds the Coast Guard's regulations which do not require incombustible furniture and joiner work on cargo ships.

Zoned mechanical supply and exhaust ventilating systems designed for quiet operation serve the accommodations. All mechanical ventilation systems which supply accommodations, commissary, and laundry spaces are equipped with filters suitable for the service involved. The portions of cargo holds 1, 2, 3, 4, and 5, suitable for carrying dry cargo, including deep tanks and hatch

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Tug "Engel"

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little loss of running time as possible.

To accomplish this change instantly, a wire rope standby cable and bridle are always attached to the after towing bitts on the barge and lead directly to the towing machine on the stern of the *Engel*, ready, at a moment's notice, to take over the tow.

On the bow, a special windlass, equipped with two large diameter gypsies and a wildcat, handles the spring line and the slack line operations, as well as the anchor chain. A towing bitt forward of the windlass is used for securing the lines that lead overboard through an unusually large port. All have been designed especially for the purpose of handling the car barges with a minimum of effort and loss of time.

When the bow and spring line are cast off, the towing machine takes over, paying out the wire cable as the tug swings away from the barge and cushioning the shock as the barge is swung around and the towing position is assumed. Accurate control of the cable by the big towing machine is smooth and positive, eliminating the hazards that handling rope by hand would entail. It reduces the necessity of a large crew, requires no mass of tangled lines, and the confusion of quick action and human error no longer dogs the crew.

Resumption of the alongside position is equally simple and routine.

The *Engel* is 149 feet long, built in 1945 by Consolidated at Los Angeles, and is powered by a Skinner Unaflow, 3-cylinder reciprocating steam engine. In addition to the Markey towing machine and windlass, she has a Markey Type GSD 4½" x 5" Drum type steam steering gear and pilot house control stand, and a Type CSW 7" x 8" steam warping capstan for line handling.

The *Engel*, as well as others of the Santa Fe tug fleet, is equipped with two-way radio which further facilitates movement of vessels and barges, being in constant touch with the dispatcher, switching engines and other units.

Deportation Case

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native-born Pole, the Polish Consul advised in writing that he could no longer be considered a Polish citizen. His attorney said that the petitioner was "stateless." Of course, the Government was willing to permit him to go back to the ship, but if that happened, he would sail to the Port of Cherbourg, France, from which he last sailed to the United States, and he would probably be denied permission to land. In other words, it quickly became evident that no other country would take him without proper documents.

Because of the unusual nature of the decree, I quote from the decision wherein the court said:

"It seems to me that this is a genuine hardship case and that the petitioner should be released from custody on proper terms. He has been sailing on American ships for nearly all of his 38 years at sea. He is now a boatswain. He has been certified many times through proper seamen's documents provided by the

American Coast Guard for service on American vessels. He served on American ships in two world wars. True, he was convicted of perjury in 1937 in that he represented himself in some documents as an American citizen. But he paid the penalty for that offense, and at the time he may have felt that he had earned the right to claim that he was an American citizen.

"Petitioner risked his life by serving on American ships in the second world war, during which he was permitted to land here and have shore leave. On one trip he was on a ship that was torpedoed in the Caribbean and was landed at the Dutch West Indies. He was transported to Miami and permitted to land there, although at that time there was an earlier deportation order still in effect against him.

"When he was taken into custody in October 1947, he was practically requested to seek admittance into the United States. That formed the basis for the most recent exclusion proceeding, which resulted in an order of deportation affirmed December 3, 1947.

"What is to be done with the petitioner? The government has had him in custody almost seven months and practically admits it has no place to send him out of this country. The steamship company, which employed him as one of a group sent to the ship by the Union, with proper seaman's papers issued by the United States Coast Guard, is paying $3.00 a day for petitioner's board at Ellis Island. It is no fault of the steamship company that petitioner is an inadmissible alien as the immigration officials describe him. But I am most concerned with the seemingly helpless status of the petitioner and the failure of the proper officials to find a means of releasing petitioner from confinement at Ellis Island.

"I intend to sustain the writ of habeas corpus and order the release of the petitioner on his own recognizance. He will be required to inform the immigration officials at Ellis Island by mail on the 15th of each month, stating where he is employed and where he can be reached by mail. If the government does succeed in arranging for petitioner's deportation to a country that will be ready to receive him as a resident, it may then advise the petitioner to that effect and arrange for his deportation in the manner provided by law."

Prototype Cargo Vessel

(Continued from page 93)

trunks, will be fitted with mechanical supply and exhaust systems incorporating dehumidification equipment supplying dry air in order to prevent the formation of sweat in these spaces. Automatic (pneumatic) dampers are required to control the dry air supply to each hold. These dampers will have remote control from the chart room and manual control at location.

Heating for accommodation and public spaces is accomplished by means of hot blast heaters installed in the zoned mechanical supply ventilation systems supplemented by convectors in spaces with high exposure losses. Galleys and pantries are supplied with tempered air. The wheel house is heated by finned piping. Other spaces requiring heat are fitted with convectors.

A smoke detection system providing visible and audible smoke detection and registering in the wheelhouse, will be installed in all cargo holds including tween deck spaces, and in paint and lamp rooms, and other spaces as required.

Fire extinction provisions consist of a water system served by pumps through firemains; a CO_2 smothering system protecting all cargo holds, cargo tween deck spaces, machinery spaces, paint and lamp rooms, etc., and portable fire extinguishers. In addition to the fixed CO_2 systems there will be installed in the machinery space, a hose reel carbon dioxide unit having two 50 pound CO_2 cylinders capable of reaching any part of the space.

R. J. Miedel, president, Atlas-Imperial Diesel Engine Company.

Lorimer Diesel Engine Merged with Atlas Imperial

R. J. Miedel, President of the Atlas Imperial Diesel Engine Co., announces the acquisition of the manufacturing assets of the Lorimer Diesel Engine Company of Oakland. The popular Lorimer engines will be manufactured and distributed exclusively by Atlas.

This marks one more step in Atlas' postwar expansion, according to Miedel, and will permit the company to offer a complete line of heavy duty diesel engines ranging from 15 to 1,000 horsepower. The supercharged 1000 horsepower Atlas Imperial Diesel engine developed during the past year from the well known 15″ bore and 19″ stroke Atlas is the largest engine made by the company. Atlas Imperial Diesel engines for thirty years have been supplying dependable, economic power, the latest of which is the new KM-668, a 9 x 10½ heavy duty diesel engine, developing up to 580 horsepower, supercharged, at 750 RPM. It is completely enclosed and is for both industrial and marine use.

The Lorimer Company, founded in 1934, manufactured engines widely known in the range of 15 to 225 horsepower. In uniting these two lines of engines, Atlas has completed one of the largest transactions in the diesel engine manufacturing business in recent years. The company will establish the Lorimer Division, which will be under the direction of Ralph S. Lorimer. It will be responsible for the sales, as well as the manufacture of both Lorimer engines and parts.

Morton Gregory Corporation Issues New Booklet

The Nelson Stud Welding Division of the Morton Gregory Corp., Lorain, Ohio, recently published an 8-page catalog of manufacturing and construction applications. Included are 24 picture paragraphs covering the uses of the Nelson stud welding gun.

Typical production units and a wide range of special studs are shown along with a concise description of the Nelson method of fastening to metal.

"Lurline" Discussion

(Continued from page 34)

veloped and stable local shipping industry. This observation was undoubtedly inspired by the present dip in West Coast shipping. With regard to this situation, certainly the current shipping holiday on the West Coast is a passing phase. It is bound to be adjusted. The natural economic advantages of West Coast ports for world-wide shipping will overcome the existing artificial and inequitable factors which now drive elsewhere shipping which belongs here. A prosperous and large shipping industry on the West Coast is inevitable.

Apropos of the present low level of West Coast shipping, the two sisters of the *Lurline*—the *Mariposa* and the *Monterey*—both destined for reconversions at least as extensive as the *Lurline's*, are awaiting the word which would stimulate West Coast shipping after having first stimulated West Coast Shipbuilding.

It was pointed out, recently, that the units of our shipbuilding industry, when exploiting the market for new ships, have to sell competitive designs at competitive building costs and in competitive building times. It would be interesting to take these elements and apply them to the situation on the West Coast.

Taking "time" first, this element is the principal one which, in the over-congested market of the last decade, was responsible for the shipbuilding which the West Coast enjoyed. To a lesser extent, the time element is the one which would apply during the present period if the demand for ships were to continue. Otherwise stated, the earning power of a ship delivered earlier from a West Coast yard might outweigh the extra building costs of that ship.

The matter of design—the second of the three elements—is an important and interesting one. With ships owned and operated by West Coast capital, and built on the West Coast to West Coast operator's requirements, it is natural and logical that the design of these ships should be developed in this geographical area. This would promote a new and fresh point of view and, while retaining integration with the traditional eastern establishments, would benefit the entire industry by progressive contributions. On this point Mr. Tate's paper has very significant implication. The design talent exhibited in the Lurline is a potential which must be nourished.

The third element—cost—and the most important one, is higher on the West Coast, and is due, of course, to higher wages, to more costly and more numerous fringe benefits to labor, and to higher transportation costs of material and component equipment, so much of which is still generated in the East. These higher costs are impossible to overcome without some sort of help until that future time when the leveling influence of the national economy, in the first place, and the continued growth of heavy industry on the West Coast, in the second place, eliminate the inequalities.

With regard to help, none would, or even should be given unless substantial over-all good results therefrom. Such good, I believe, can be demonstrated for an adequate West Coast shipbuilding subsidy. I believe that no one would challenge seriously the great benefits to national defense if this vital industry on the West Coast were placed in a position, when faced with a national emergency, to accelerate its production from a running start

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The Matson Lines

(Continued from page 50)

America declared war.

Maui, Matsonia, Wilhelmina

The Matson fleet in 1917 totaled 50,000 dead weight tons. Serving in World War I the *Maui, Matsonia* and *Wilhelmina,* because of their large steaming radius and unusual oil capacity unmatched by other merchant vessels, were of incalculable value as transports. They not only carried thousands of tons of fuel oil, war supplies and troops across the Atlantic, but were able to supply fuel oil to destroyers in mid-ocean. Later on in the war the government took over all of Matson's ships as well as all ships under the American flag.

Captain Matson, who had built the Company and its fleet of merchant ships, never lived to know the service to his country that the ships flying his house flag had rendered. His interest in his company never lagged, but he had already been crowding the years before the war broke out. He passed away on October 11, 1917 and never saw the plaques bestowed on his ships by a grateful government for meritorious service.

When the war was over and ships were turned back to their owners, Matson resumed its service to Hawaii on a regular schedule and continued to plan for the future of the trade. With the next few years came still greater growth and expansion. Sugar production increased and pineapple reached 5,000,000 cases per year. The Matson fleet again proved too small; larger ships with more speed and greater capacity were needed.

In 1919 plans were drawn for two new freighters, the *Manulani* and *Manukai,* with a capacity of 607,705 cubic feet of dry cargo and 13,800 cubic feet of refrigerated cargo space. These two freighters were the largest cargo ships constructed in American yards, and the largest cargo carriers operating in the Pacific. They were 480 feet long with a speed of 12.4 knots and cost over two and one-half million dollars each. The *Manulani* made her maiden voyage from San Francisco on April 30, 1921 and the *Manukai* on July 1 of the same year.

The year 1921 saw the ground breaking for the Matson building at 215 Market Street, San Francisco, which was completed in 1924. An addition to the building has been completed since the war.

Three small vessels, the *Mahukona, Makaweli* and the *Makena,* of 4500 dead weight tons each, were purchased in 1922 to serve the various island out-ports, providing plantations with direct carriers to transport their sugar and molasses to San Francisco instead of trans-shipping via Honolulu.

The need for additional refrigerated cargo space became apparent with the increase in Island population and in 1923, the purchase of the 6457 gross ton *Mauna Ala* added another 11,000 cubic feet of refrigerated cargo space to the fleet. The *Manulani* and the *Manukai* each carried almost 14,000 cubic feet of such cargo. In 1923 the 6092 ton *Makiki* with 10,000 cubic feet of refrigerated space was purchased and in 1925 the 7409 ton *Maunawili* was added to the fleet with 19,000 cubic feet of reefer space. The 7159 ton *Maunalei* was placed on the run and finally in 1926 the *Maliko,* a 6847 ton steamer with almost 16,000 cubic feet of refrigerated cargo space was added.

Passenger traffic was beginning to outstrip the facilities of the *Maui, Matsonia, Wilhelmina* and *Manoa,* and

by 1925 the indication was that the traffic would continue to rise as the popularity of Hawaii as a vacation tourist playground increased. Matson had already begun laying plans to further develop the tourist crop by providing newer passenger vessels together with more luxurious hotel accommodations in Hawaii. Plans were realized in the Royal Hawaiian Hotel on the beach at Waikiki with accommodations for 600 guests and the new express passenger liner *Malolo* (since renamed the *Matsonia*). The new liner made its run between San Francisco and Hawaii in 4½ days, cutting nearly 2 days from the previous schedule. The *Matsonia* sailed from New York, October 27, 1927 and departed for Hawaii on her maiden voyage November 16, of the same year. This vessel offered almost 600 passengers such speed and luxury as to render other Pacific passenger liners practically obsolete. Her appointments rivaled the best of the crack trans-Atlantic liners and she was the last word in ocean luxury. Shippers of refrigerated foods were also offered a quicker voyage than was ever before possible and the shipment of such goods increased because they were delivered to the markets in better condition due to the speed of the vessel.

Oceanic S. S. Co.

The next important expansion program was the acquisition in 1926 of the Oceanic Steamship Company whereby the Matson Lines acquired the physical assets of that company and took over their old passenger-freight vessels the *Sierra, Sonoma,* and *Ventura* and continued to operate them on the Australian run.

Matson's decision to purchase Oceanic and extend its Hawaii route down through the South Seas and Australia was influenced by the conviction that the tourist trade could be expanded, and that a new express freighter service between the West Coast of the United States and the Antipodes would be of great value to American commerce. The new company with bigger and better ships, in the next decade put United States shipping in a dominant place in the South Seas for the first time.

With the new route came a government mail contract with the provision that the Oceanic Steamship Company was to construct two combination passenger and freight steamers for the new United States service. Matson's contract with the government called for the construction of two Class-2 ships for the Australian service, but Matson actually constructed three ships of the Class-1 type. Two of these vessels, the *Mariposa* and *Monterey,* were built for Oceanic and the third, the *Lurline,* was built for the Hawaii trade to run opposite the *Matsonia,* providing a weekly local sailing to Hawaii. The *Mariposa* and *Monterey* were launched in 1931, are 632 feet long, 18,017 gross tons with a maximum speed of 22¼ knots and a passenger capacity of 728. Their freight capacity was 230,264 cubic feet dry cargo space and 29,670 cubic feet of refrigerated cargo space. The vessels had the unusual steaming radius of 18,450 miles at 21½ knots and a fuel bunker capacity of 43,904 barrels of fuel oil. The *Mariposa* made a cruise around the Pacific on her maiden voyage and on her return was placed with the *Monterey* on the route from San Francisco to Hawaii, to Pago Pago (American Samoa), Suva (Fiji Islands), Aukland (New Zealand), terminating at Sydney and Melbourne in Australia. The round trip voyage took fifty-six days, providing a sailing from San Francisco every twenty-eight days. The new ships with a sailing

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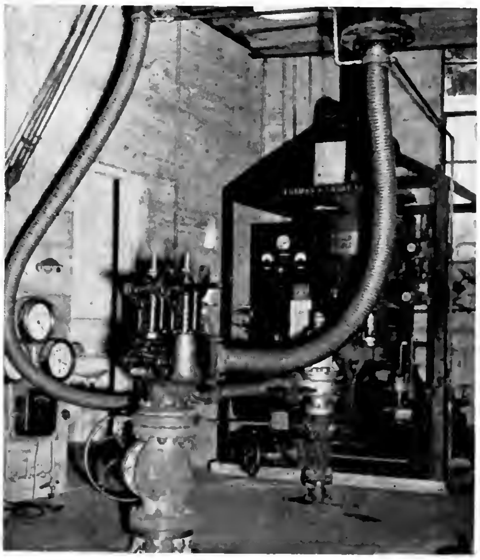

The Matson Lines

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schedule of nineteen days from Sidney to San Francisco, brought Sydney within twenty-eight days of London via the Pacific route, thirteen days faster than via the Suez and five days faster than Sydney to Vancouver and across Canada. The shortening of transit time to Europe, together with modern luxury ships, tapped the large passenger trade then existing between Australia and Great Britain.

Lurline

The third of the new ships, the *Lurline,* was finished in 1933 and the four so-called "White Ships" replaced the other Matson passenger vessels in the Hawaii and South Pacific service. By their larger capacity, speed, and service they vastly increased both the travel and trade moving out of San Francisco and California and they sailed on their regular schedules until the outbreak of World War II.

It has been said that the ability of the Allied nations to move the necessary goods simultaneously to war theaters all over the globe, was one of the important factors in the success of the Allied cause. Undoubtedly the American Merchant Marine and its operators, under government jurisdiction, did play an important part in this success. Matson has a proud place among the other American Merchant Marine organizations in achieving that record. Prior to the outbreak of the war, Matson's freighter fleet was already operating upon greatly increased schedules, transporting large quantities of essential supplies for defense in the more remote Pacific areas where the United States Government was constructing military installations. Four Matson freighters were operating between Atlantic Coast ports and the Red Sea for the British Ministry of War Transport. The *Mana* and the *Makawao* transported ore from South America to Canadian Ports. The *Ewa* and the *Waimea* carried supplies to the Philippines, went on to India, and brought ore back to Baltimore. The *Mahimahi, Mokihana, Liloa,* and *Kaimalu* carried cargoes from Atlantic Coast ports to the Orient, Persian Gulf, and Indian Ocean and returned via Suez.

When the Japanese attacked Pearl Harbor on December 7, 1941, Matson's entire organization—men, ships and facilities—were taken over by the United States Government and brought into full scale war. Matson Navigation Company virtually ceased to exist, becoming for the duration an important cog in the government war making machine. The ability of the United States to produce the necessary goods, together with their shipbuilding program and the ship operating program, accounted ultimately for success in getting the right material to the right place at the proper time. As ships were built they were assigned to private operators; Matson Lines, at the peak, operating 143 vessels in all war theaters in the world. During the 1945 peak, Matson completed 344 voyages, or almost one every day. Eleven of Matson's own vessels and four government built ships were lost to enemy action or to other hazards. The liners *Lurline, Mariposa, Monterey,* and *Matsonia,* were quickly converted to troop transports and served in that capacity for the duration.

At the request of the Navy, Matson's Maintenance and Repair Division was greatly expanded to provide

urgently needed repair facilities on the West Coast. This division provided maintenance and repairs and conversion work on 1850 vessels during the war.

Matson, throughout the Pacific, served as berthing agents for the War Shipping Administration. It covered passenger and cargo operations for all War Shipping Administration vessels operating between West Coast ports, Hawaii, Australia, New Zealand and the ever expanding network of South and Southwest Pacific bases.

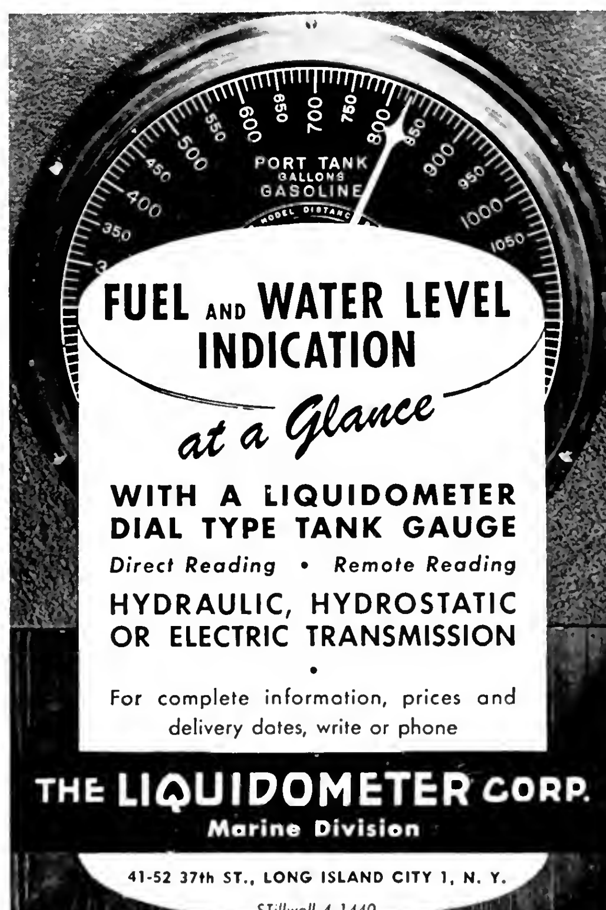
The end of the war found Matson one hundred per cent on a continued full-scale war basis. The four passenger liners continued in government service bringing troops home from all over the world. The first of these passenger ships was turned back to Matson in 1946. Their restoration to peace time use meant the virtual rebuilding of the ships. The original Matson freighter fleet was decimated by hard usage; eleven of the original Matson fleet of thirty-eight had been lost, ten had been requisitioned by the government, and the others had been rendered unfit for immediate operation.

The return to normal peace time schedules and operation was hampered not only by the late return of vessels, but by material shortages and inflated costs. The *Matsonia*, the oldest of the four, was the first of the large passenger ships to be returned to Matson by the government. She was immediately restored to her prewar condition and furnishings, and placed on a so-called "interim passenger service" on the triangle run between San Francisco, Los Angeles, and Hawaii beginning May 23, 1946. The *Lurline* was returned to the company in May, 1946. She was completely rebuilt from her bare hull and made her first postwar voyage April 15, 1948. Reconversion work started on the *Mariposa* and the *Monterey*, a few months after the *Lurline*. However, by July 1947, Great Britain was already in an economic crisis. The "dollar shortage" had begun to manifest itself and obviously threatened potential passenger traffic between Australia and Great Britain via the United States. This situation increased the uncertainty of profitable operation of these vessels on that run and therefore work on both vessels was stopped. Details are presently being worked out with the government regarding the eventual completion and use of at least one of these vessels.

New Freighter Fleet

The freighter fleet had experienced hard usage during the war and the standards of the postwar period demanded greater speed and greater economy in operation. Matson invested $27,000,000 in a new postwar freighter fleet consisting of fifteen fast, modern C-3 type vessels, three Liberty type freighters and four C-2 type cargo vessels. Each one was especially selected and modernized to meet the requirements of its special task. The C-3's are engaged in weekly service from San Francisco and Los Angeles to Hawaii and bi-weekly service from the Pacific Northwest to Hawaii. The Liberty type freighters are engaged in carrying lumber, fertilizer and other bulk items to Hawaii, and the four C-2 type cargo ships are operated between the Pacific Coast Ports and Australia/New Zealand, via Samoa and Fiji. Besides providing a 30% increase in speed over the prewar seven to eleven days transit time, the C-3's provide additional refrigerated space divided into a total of twenty refrigerated compartments, for perishable cargoes. These compartments have purposely been made different sizes ranging from 1865 cubic feet to 4890 cubic feet. The total capac-

(Please turn to page 103)



Fighting Fire at Sea

(Continued from page 43)

bonaceous material (such as bedding, clothing, wood, canvas, rope, paper, and others) where the cooling effect of quantities of water or other extinguishing agents containing large percentages of water is generally desirable.

Class B fires are fires in flammable liquids (such as gasoline, oils, grease, paint, turpentine, and others) where a smothering or blanketing effect is essential for extinguishment.

Class C fires are fires in electrical equipment, where the use of a "non-conducting" extinguishing agent is of first importance.

Practical Fire-Fighting Technique

Fires aboard ship can be grouped into two distinct categories. There are those that occur below the main deck, where there is little or no draft and ample compartmentation; and there are fires that occur in the superstructure, where the draft conditions are usually severe and where the area involved may be extensive.

Superstructure Fires. Superstructures particularly in passenger vessels, are comparable in general arrangement and layout to hotels. We find large spacious salons and lounges or small cabins opening on long passageways. Controlling fires under such circumstances is much more involved than handling a fire below the main deck. (The hazard in passenger vessels that have staterooms below the main deck is comparable to the hazard in the superstructure.) There is always the possibility of a large life hazard. The severe draft conditions will aid the spread of fire greatly and tend to increase its intensity. The relatively large area of public spaces affords ample fuel for the development of a rapidly burning fire. In dealing with superstructure fires, seamansip is a necessary aid to fire fighting and the vessel should be maneuvered to keep the wind abeam and so carry fire and smoke over the side. Every effort must be made to prevent the fire from spreading from fore to aft or vice versa. If sea conditions permit, it may be well to let the ship lie to prevent the creation of drafts.

As soon as the location of the fire is determined, hose lines must be laid to points fore and aft of the space involved. Streams from these hose lines should be operated to confine the fire and prevent it from extending. All fire doors or draft stops should be closed. Other hose lines must be laid out on the deck above to keep it cool and to prevent upward communication. Hose lines should be laid out also on the deck below in order to control any fire that may drop below through openings. Having established walls of water through which the fire cannot extend, and with the deck above properly cooled by hose streams, it will be possible then to work in and extinguish the main body of fire. However, it must be remembered that it is of utmost importance to make sure first that the fire is confined and it is only when this fact has been definitely established that effort should be made to complete the extinguishment.

Fires Below the Main Deck. The theory of controlling a fire aboard ship can be understood best if we visualize a compartment as a metal box that has four sides, a top, and a bottom through which the fire may spread by radiation or conduction. Generally speaking, the spread of fire by convection below decks is improbable. If the four sides, top, and bottom of our hypothetical metal box can be kept cool by the judicious use of water there can be no extension of the fire and, if necessary, the fire can be permitted to burn itself out in the compartment wherein it originated without endangering the safety of the ship. Seamanship is not as important in handling fires below decks as it is in cases of superstructure fires.

General Procedure

When a fire alarm is sounded on board a vessel, the fire parties should go into immedate action, and proceed in

accordance with a general fire drill. The officer commanding fire operations must determine quickly the following facts:

1. Where the fire is. (Sometimes, where two or more fires are.)
2. What is burning.
3. What is the extent of the fire.
4. What combustibles are in the immediate vicinity —in all surrounding spaces and in the compartments above and below.
5. What vents and other channels there are, and what breaches, resulting from accidents, would facilitate the spread of the fire.
6. Whether the fire main is furnishing sufficient pressure. (The engineering force would be notified if the pressure were insufficient or if additional pressure were needed to supply the many lines laid on an extensive fire.)
7. What method of extinguishment is indicated.
8. What is the best technique (a) to prevent the spread of the fire, (b) to put the fire out, and (c) to avoid affecting the stability and buoyancy of the vessel.

Upon learning where the fire is, the fire officer makes a hurried survey to find out what is burning and how extensive the fire is. He may discover, perhaps, that he has two or three fires instead of one to extinguish, and they may not be fires of any single class. Methods of extinguishment would have to be applied accordingly. The fire fighter may discover that the fire is an incipient one; if so, he would proceed to extinguish it forthwith, without taking extensive measures to keep the fire from spreading, as such measures would not be necessary. Wherever built-in fire-extinguishing systems are provided to protect spaces afire, they should be utilized immediately. For the present purpose, however, the supposition will be that the fire fighter has to extinguish fires that have progressed beyond the incipient stage. For the complicated fire, or simultaneous fires, that may require a combination of methods, no detailed program can be drawn up, but it can be said that fog has the most general application and would serve in nearly every situation.

Upon learning where the fire is, what is burning, and the extent of the fire, the fire fighter establishes a fire area, an area within which extreme precautions are observed. Within its boundaries, doors, hatches, manholes, ventilation ducts, and all other vents not already closed are closed, as circumstances warrant and as far as it is practicable to do so without interfering unduly with the operation of the vessel.

Cooling water spray is applied, if practicable, to all surrounding bulkheads, to the overhead in the compartment below, and to the deck of the compartment above. The fire fighter is aware of the fact that a fire in a compartment means that, so to speak, he has a fire in a metal box that is sending out heat in *all* directions. Not only does the heat pass by conduction and radiation through the four bulkheads of the compartment on fire, but it passes in the same manner down through the deck and up through the overhead. Cooling must be applied on all four sides of the compartment and also above and below it. (One boundary—or several—may be the hull of the vessel; and the sea then does the cooling.)

Cooling the surrounding bulkheads and decks of a compartment on fire is resorted to for two purposes—to prevent the spread of the fire to combustibles in adjacent compartments, and also to prevent the heat from weakening and distorting these structures.

Another means of confining a fire within bounds may

(Please turn to page 106)

Transferred to New York

Hugh Gallagher

Hugh Gallagher, vice president of Matson Navigation Company, was recently transferred to their New York offices where he has general supervisory charge of the Company's Eastern affairs.

The move was made to bring about closer contact with industry thinking and activities and strengthen the Matson organization in all phases of its Eastern activities.

New Accommodation Ladder

The Accommodation Ladder illustrated is a new design in galvanized steel, which is full-feathering in all positions. The treads are exactly level for all working positions of the ladder, from horizontal to vertical.

The ladder shown is thirty feet long, and is equal in weight to a conventional wood ladder of similar length. Strength, however, is in the ratio of about 3.5 to 1 in favor of the steel, and the inherent advantages of steel, viz., low cost, dependability, ease of repair, low maintenance, etc. are so familiar as to need little mention.

It is well known that the conventional companion ladder, with it's steps slanted away from the horizontal, has presented a mental and physical hazard to many a fellow returning to his ship in a jovial mood. The new ladder, with level, non-skid, steps and staunch safety hand rails (not fully rigged in the picture) is secure even for a chap loaded with high spirits and his sea bag.

The ladder was designed by Thomas T. Lunde Associates, Naval Architects, and is manufactured by Pacific Ship Repair, Inc., Pier 25, San Francisco.

Steel boarding ladder with automatically adjustable steps.

Fighting Fire at Sea

(Continued from page 103)

be resorted to by the fire fighter whenever practicable. He may remove combustibles from the immediate vicinity of a fire. Especially when the combustibles present a great hazard, such as that presented by gasoline and other explosives, the fire fighter may remove them to a safe distance, or even jettison them. Since it is not always possible or practicable to remove combustibles from the vicinity of a compartment on fire, the fire fighter may fill the compartments containing them with carbon dioxide, and seal the compartments; or he may depend upon cooling and smothering the combustibles with fog spray from all-purpose nozzles, or he may flool the compartment with steam, or with water through a sprinkling system or by a hose line.

It is possible to burn holes through the decking by using portable oxyacetylene cutting outfits and to drop water fog nozzles through these openings so cut. By staggering the holes so cut, it is possible to provide a complete coverage over the area below without exposing personnel to the fire conditions on the lower deck.

In deciding upon effective means for preventing spread of a fire, the experienced fire fighter acts with a thorough understanding of the means by which heat is transmitted. He knows all the possibilities in a set of conditions at a fire, and even though, on occasions, he may be unable to confine a fire within bounds, he is not taken by surprise, no matter what happens. He is always prepared to make such rapid adjustments in his extinguishing methods as the changes in the fire boundaries make necessary.

While the work of preventing the spread of fire is under way, the work of extinguishment is not neglected. The two are undertaken simultaneously, and they are equally important. Indeed, the experienced fire fighter probably would say that confining a fire within bounds is more important of the two. He would consider that a fire so confined is definitely under control. His main problem then would be to put the fire out; and, until the equipment best suited for the task can be put into operation, he uses whatever equipment there is at hand, provided that it can be used effectively.

In the case of fire in oil, gasoline, paint, or other Class B combustible, vapor is being released at the surface and ignited. It is apparent that such a fire must be smothered and preferably covered with foam which will cut off the supply of oxygen, check the vapor pressure, and act as a barrier against radiant heat from hot bulkheads or other metal structures. Fog or fog-foam will cool these fires quickly in many situations, and, as it absorbs heat, water fog will be converted into a smothering blanket of steam.

Tanker Fires

During World War II, combat fire teams of the United States Navy had remarkable success in controlling tanker fires. They developed a technique that was most effective and resulted in an average salvage of about 70 per cent of the cargo and ship. The factor that makes a tanker fire severe is the terrific radiation. It is this radiation that creates the barrier that prevents a fire party from getting close enough to the burning surface of the tanker cargo to apply foam. The United States Navy fire fighters boarded the tanker from the windward under the protection of high-capacity water fog-nozzles. This equipment absorbed the heat so rapidly that after a few minutes it was possible to secure a footing on the deck. Continued application of the water fog further absorbed the heat until it was possible, in perfect safety, to reach the ullage holes or cargo hatches and to discharge foam down them to the burning surface of the oil. The application of this foam blanket completed extinguishing operations.

The same technique can be used today aboard our modern tankers, if we provide sufficient pumping capacity in our engine rooms and proper water fog spray equipment for absorbing the radiated heat and permitting the fire parties to reach the cargo tanks involved with safety.

Conclusion

If this paper will increase the fire consciousness of naval architects, marine engineers, and ship operators, it will be well worth the effort taken to prepare it. It must be borne in mind that the entire subject of fire prevention and fire protection for ships is so broad and so complex that it cannot be covered thoroughly in this paper. However, an effort has been made to highlight the important features that should be taken into consideration if our ships are to sail the seas comparatively safe from fire.

Java Pacific Line

(Continued from page 58)

ing fixtures by the Mott Company of Philadelphia; and the non-watertight lighting fixtures including decorative fixtures and berth lights were furnished by Murlin Manufacturing Company. All furniture, decorations and trim for offices and officers', crew's and passengers' quarters including dining saloon, smoke room, lounge and bar were furnished and installed by Hopeman Brothers.

"W. M. Wightman"

(Continued from page 61)

the engine, which contains the following equipment:

- Engine oil pressure and temperature gauge
- Engine water temperature gauge
- Engine fuel pressure gauge
- Hydraulic reverse gear oil pressure gauge
- Battery charging ammeter
- Tachometer
- Alnor Pyrometer with 8-point switch, which measures exhaust temperatures of each cylinder as well as the common exhaust
- Engine throttle control
- Hydraulic reverse gear control lever
- Engine starting switch
- Engine stop control
- Safety controls—sounding a 32 volt alarm bell in the event of low lubricating oil pressure or high water temperature.

The bilge pump consists of a 1½" Deming Model 4010 furnished by the Simonds Machinery Company—this pump being mounted on the forward end of the engine and capable of being thrown in and out by a Kinney Dry Plate Clutch driven from the front power take-off of the engine.

The propeller installed is a 54 x 47" Doran which the engine normally turns through the 3:1 Western Gear at a propeller speed of 300 r.p.m. with the engine operating at 900 r.p.m. At this speed the vessel makes 10 knots. At the trials, however, and without any evidence of stress, the engine was able to turn the wheel up to 355 r.p.m., at which speed the 10 knot speed was considerably bettered, although no trial run was made at this higher revolution.

The Buda Company has standardized on the Western Hydraulic Gear for its larger marine engine, the Model 8DCMR-2505, which in the un-supercharged model has a rating of 250 HP at 1000 engine r.p.m., and in the supercharged model has a rating of 310 HP at 1000 r.p.m. All Buda ratings are conservative, as the un-supercharged engine actually develops 330 HP at 110 r.p.m. and the supercharged engine develops 370 HP at 110 r.p.m. The Western hydraulic gear is also available on other Buda models.

The Matson Lines

(Continued from page 101)

ity of each ship is equal to that of about 10,000 ordinary household refrigerators and the temperature can be maintained according to the needs of the particular cargo, ranging from ten degrees below zero to fifty-five degrees above zero. As is well known the C-3's are probably the most efficient freighters ever built, with their ten double rigged sets of fast, modern, cargo handling gear.

The C-3's are the: SS *Hawaiian Merchant, Hawaiian Builder, Hawaiian Planter, Hawaiian Banker, Hawaiian Craftsman, Hawaiian Educator, Hawaiian Retailer, Hawaiian Fisherman, Hawaiian Packer, Hawaiian Rancher, Hawaiian Farmer, Hawaiian Refiner, Hawaiian Pilot, Hawaiian Wholesaler,* and *Hawaiian Citizen.*

The C-2 cargo vessels operating on the Oceanic route are the SS *Ventura, Sierra, Sonoma,* and *Alameda,* and the Liberty type ships are the *Hawaiian Forester, Hawaiian Lumberman,* and *Hawaiian Logger.*

Matson Navigation Company with the new *Lurline* and the possibility of at least one other vessel like her, together with the modern freighter fleet, will continue to play its part in the transportation system from the Bay Area and the port of San Francisco, the Hawaiian Islands and the South Seas. It will continue to grow with San Francisco to fulfill the heritage of this, its port.

Coast Guard Seeking Engineers and Naval Architects

The United States Coast Guard is seeking immediately a limited number of Naval Architects, Electronic Engineers, Civil Engineers and Electrical Engineers, for commissioning in its officer corps. Applicants must have graduate education and professional experience.

The prime objective of the Coast Guard in this program is the selection of career officers. Original commissions will be in the Coast Guard Reserve with consideration for a permanent commission at the end of a two-year active duty period. Officers commissioned under this program are sent to the Coast Guard Academy, New London, Connecticut, for a brief indoctrination course prior to being assigned to a duty station.

Commissions as Lieutenant (junior grade) or Ensign are available depending on qualifications and experience. These commissions will carry the full benefits and privileges, including medical, pay, and other allowances given to officers of equal rank in other Services.

For full details, write to the U. S. Coast Guard, Washington 25, D. C.

"Lurline" Discussion

(Continued from page 97)

rather than from a standstill. This advantage is worth more to the country at large than the public presently is willing to support. The efforts to vigorously drive this point home are well worthwhile. Still on the same topic—but from a local view, how much more logical would be local aid in some form than is unemployment compensation, and how much more palatable and acceptable would be the use of these same funds as employment insurance premiums, rather than unemployment payments. To these premiums would be added, of course, much more to complete the take home payroll. Also from a local viewpoint, and a matter which is understood to be even now under consideration, relief from the burden of certain taxes not assessed in other shipbuilding and shipping states—would have a beneficial effect upon the public at large, far in excess of taxes forgiven, to the end that the Pacific shipowners and the Pacific shipyards may compete successfully in the national market.

Bilgers Frolic

The 20th Annual Stag Barbecue and Sports outing of the Bilge Club of Los Angeles Harbor will be held at Palos Verdes Country Club, Saturday, June 25. They have dubbed it a "Joy Voyage".

CREW LIST

Honorary General Chairman..............Harry Summers
General Chairman..............Floyd Nelson
Barbecue Chairman..............Walter C. Richards
Assistant Barbecue Chairman......Hampton Neergaard
Entertainment..............Jimmie Buntin

COMMITTEES IN CHARGE

Golf: Chas. I. Houghton; *Prizes*: John Marriner, Earl Archibald; *Attendance*: Comdr. Wm. Mason; *Reception*: Gil Reeves, Fred Cordes; *Baseball*: T. W. Buchholz; *Tug-O-War*: Jimmie Buntin; *Grounds*: Carl Morabito; *Publicity*: Earl Archibald; *Master of Ceremonies*: John McHose; *Historian*: Harry Summers; *Finance*: Winn Rash; *Sergeant-At-Arms*: Capt. T. W. Peters; *Secretarial*: Robt. R. Snograss.

Mariners Meet

The quartet below were snapped at the May 4th meeting of the Mariners Club of California, where Fletcher Monson was given the traditional clock-barometer combination in thanks for a successful Mariners' year under his presidency. Left to right are Captain Al Berry, new president, Fletcher Monson, Dick Glissman and Captain Tom Hunter.

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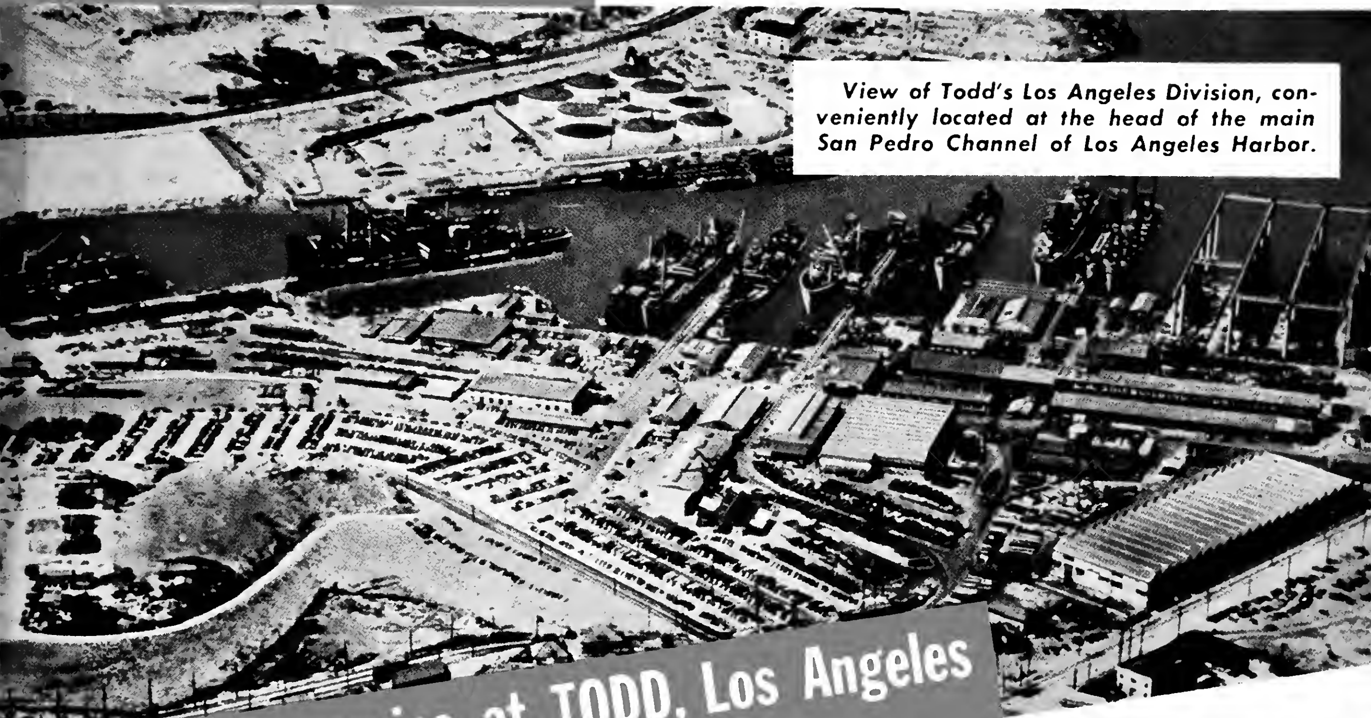

View of Todd's Los Angeles Division, conveniently located at the head of the main San Pedro Channel of Los Angeles Harbor.

• Weld inspection by Gamma-Ray Radiography—modern technique in use at Todd yards—records internal cracks or cavities on film.

Pacific Marine Review

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Pacific MARINE REVIEW

Shipbuilding Allocation and National Security

THERE is a tendency in Eastern newspapers to ridicule efforts that are being made toward the allocation of shipbuilding to Pacific and Gulf coasts in addition to Atlantic. Prominent in these efforts are Congressmen from California and Washington, as well as Maritime Commissioners Carson and Coddaire, who are supporting H.R. 4190 by Congressman Allen of Oakland. This bill would distribute ship construction, in which the government had a stake, so that shipyard employment might be maintained in the ratio of 60,000 on the Atlantic, 10,000 on the Gulf, and 30,000 on the Pacific Coasts.

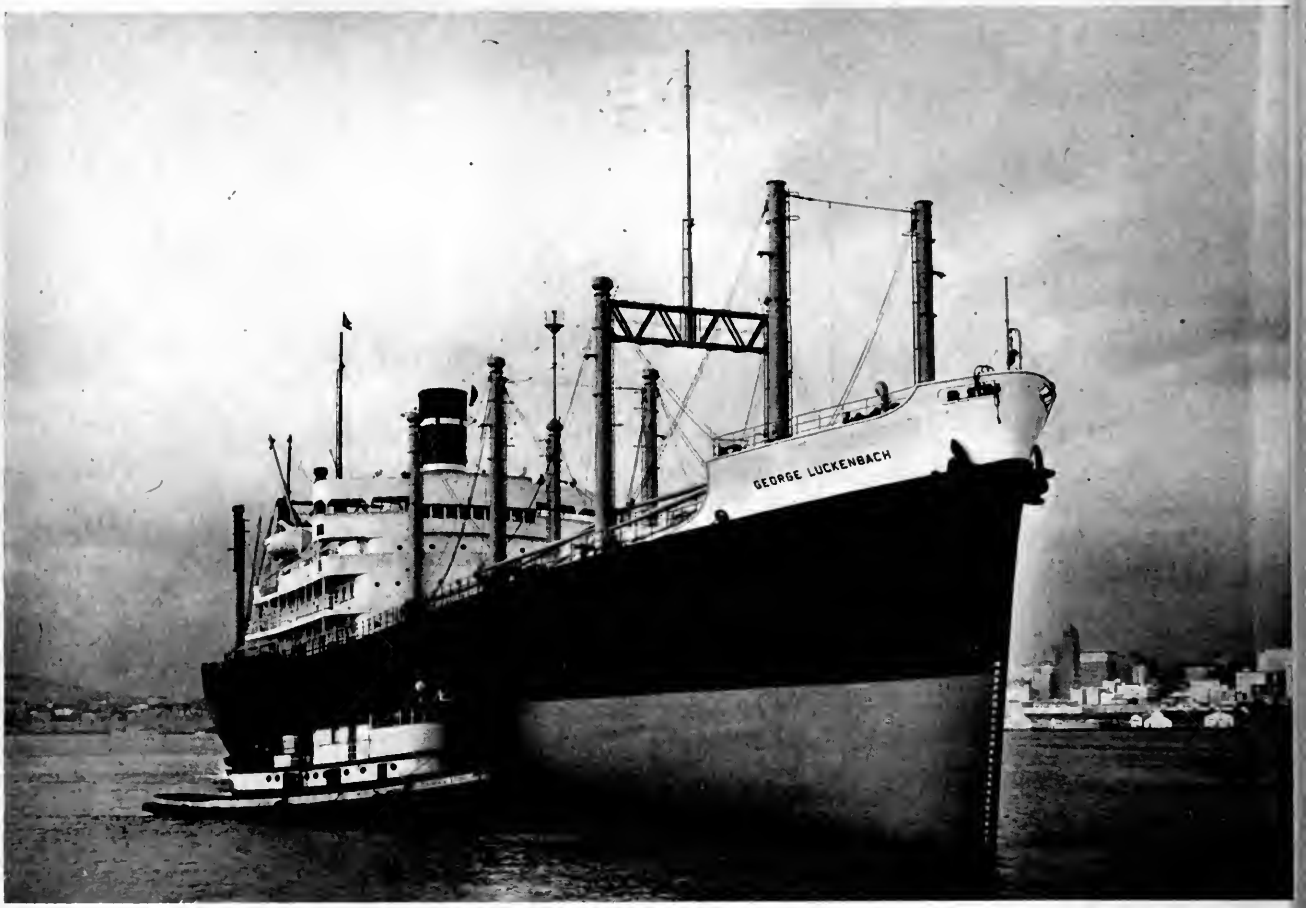
The premises on which the opposition is based are weak. Criticism of the West for hiding behind National Security is followed by a demand that only certain Eastern yards get new ship contracts, because this same National Security requires it. The Eastern yards are described as "long experienced" and "whose staffs have been held together through bad times and good," and whose opportunities "should not be allocated to newer yards."

National Security is, of course, the business of every person and every area in the United States. It may not always be easy for distant eyes to see dangers in their true perspective, but dangers are not remote from American interests in the Pacific. Remember Pearl Harbor, and the need for ships, and the West Coast's production of more ships than Atlantic or Gulf Coasts. Costs may be more, but time may be vital. It has been said that money may be appropriated but a second of time may not.

On the subject of shipyards, old and new, Bethlehem's San Francisco yard is passing its 100th year and has had "bad times as well as good." Moore's Oakland yard finished its first tanker in 1910. These yards' ships have ranged widely in types and have involved great skills. Bethlehem's 500 ships have included three battleships (one of which was the great *Oregon*), 12 cruisers (one of which was the famed *Olympia* at Manila Bay), 119 destroyers (their last 54 vessels have been destroyers), 29 submarines, 62 tankers, 41 freighters and many passenger-cargoes, ferries, and miscellaneous. Across the bay at Alameda, they built 10 P2's, including the liners *President Cleveland* and *President Wilson.* The yard's first cruiser was completed in 1887. Moore's great war record was but a climax to a long list of ships including Matson liners which were the largest on the Pacific in their time. Todd's and other yards have records of their own.

It is noted that the Navy's Bureau of Ships at first opposed and now conditionally approves West Coast shipbuilding, which, by the way, is the established policy of the Nation as reflected in the Merchant Marine Act of 1936. The Navy yards at Bremerton, Mare Island, San Francisco and Long Beach, not to mention Pearl Harbor, need a reservoir of skills and supply depots which private yards in their areas keep available. The Navy's cooperation would be welcomed by West Coast yards, for employment therein is hard to maintain at present.

While the inundation of China and other developments in the Pacific menace American security, it is not alone for security reasons that the West claims consideration. Many thousands of families and many hundreds of businesses dependent on ship yards, and who are helping to pay the bill in both money and consequences, want a fair part of the next decade's 1,000 new ships to be built in West Coast yards. The whole country should be glad that they are available and to give them their share.



"George Luckenbach," ex "Sea Star," after conversion completion at Todd's Seattle yard.

Luckenbach Reconversion Completed

THE simultaneous reconversion of seven C-3 vessels in four Pacific Coast yards is quite an undertaking, and the successful handling of it by Luckenbach Steamship Company is a tribute to the management and its advisers. But big undertakings are not new to Luckenbach management.

In a preliminary way the reconversion program was outlined in the January *Pacific Marine Review* wherein the inboard profile and plans of the four upper decks were published, as were also some technical details and the progress of the bidding. Result of the latter was the award of the *Sea Star, Sea Flier* and *Sea Runner* to Todd's Seattle yard, *Sea Bass* and *Sea Devil* to Moore Drydock Co., Oakland, *Sea Barb* to Willamette Iron & Steel Co., Portland, and the *Sea Cat* to Consolidated Builders, Portland. Delivery of the final vessel is scheduled for July 19.

For the most part, the work on all these ships was similar, varying only due to the respective condition of the vessels and their equipment. The main turbines, for instance, were opened for overhaul under the supervision of the manufacturers' service engineers. In general all internal parts as rotor wheels, buckets, and packing fits, diaphragm discs, nozzle sections, and packings, and casings were found to be in good condition with little erosion or corrosion having taken place. All parts were cleaned. Clearances throughout the units were checked and casings closed. Carbon packing casings were opened and new packings installed. Bearings and journals were checked and replacement bearings installed when necessary. Control valves were checked and ground in as required. Maneuvering and governing valves were opened and ground in as needed. Overspeed governor and low oil pressure trip safety devices were checked and set. Turbines are General Electric on the *Sea Barb, Sea Cat, Sea Runner, Sea Devil, Sea Flier* and *Sea Bass,* and Westinghouse on the *Sea Star.* Major change in the outside appearance is the addition of the bridge wings and the installation of Kearfott windows, in which a set of hand-cranked helical gears animate the frameless glass. Willamette installed new kingposts fore and aft, and new booms were equipped with American Hoist & Derrick winches and rigging.

The Todd System of steam atomizing oil burners is being tried in the *Sea Star,* and may be installed in the rest of the fleet later.

Coffin feed pumps and Leslie valves were installed in

all ships.

All of the vessels have accommodations for twelve passengers. There is a passengers' lounge on the Cabin Deck, starboard side, forward, this lounge of sufficient size to accommodate all passengers, and with varying architectural and decorative features and color schemes on the different vessels, with Kearfott windows, carpet flooring, large panel mirrors, and custom built furniture. There is rubber tile floor covering in all passages and on the Boat Deck where the passenger rooms are located.

All passenger staterooms are treated in varying color schemes, with modern Arnot furniture installations and carpet floor coverings.

The officers and passengers dining room is fitted out to accommodate 28 persons. Decorative features include large mirrored walls and decorative murals, the design varying on the different ships. Special fabrics are used in covering the chairs, and in draping the window openings.

All of the vessels have now been renamed as follows:

Sea Barb is now *F. J. Luckenbach.*

Sea Star is now *George Luckenbach.*

Sea Flier is now *Horace Luckenbach.*

Sea Runner is now *Robert Luckenbach.*

Sea Bass is now *William Luckenbach.*

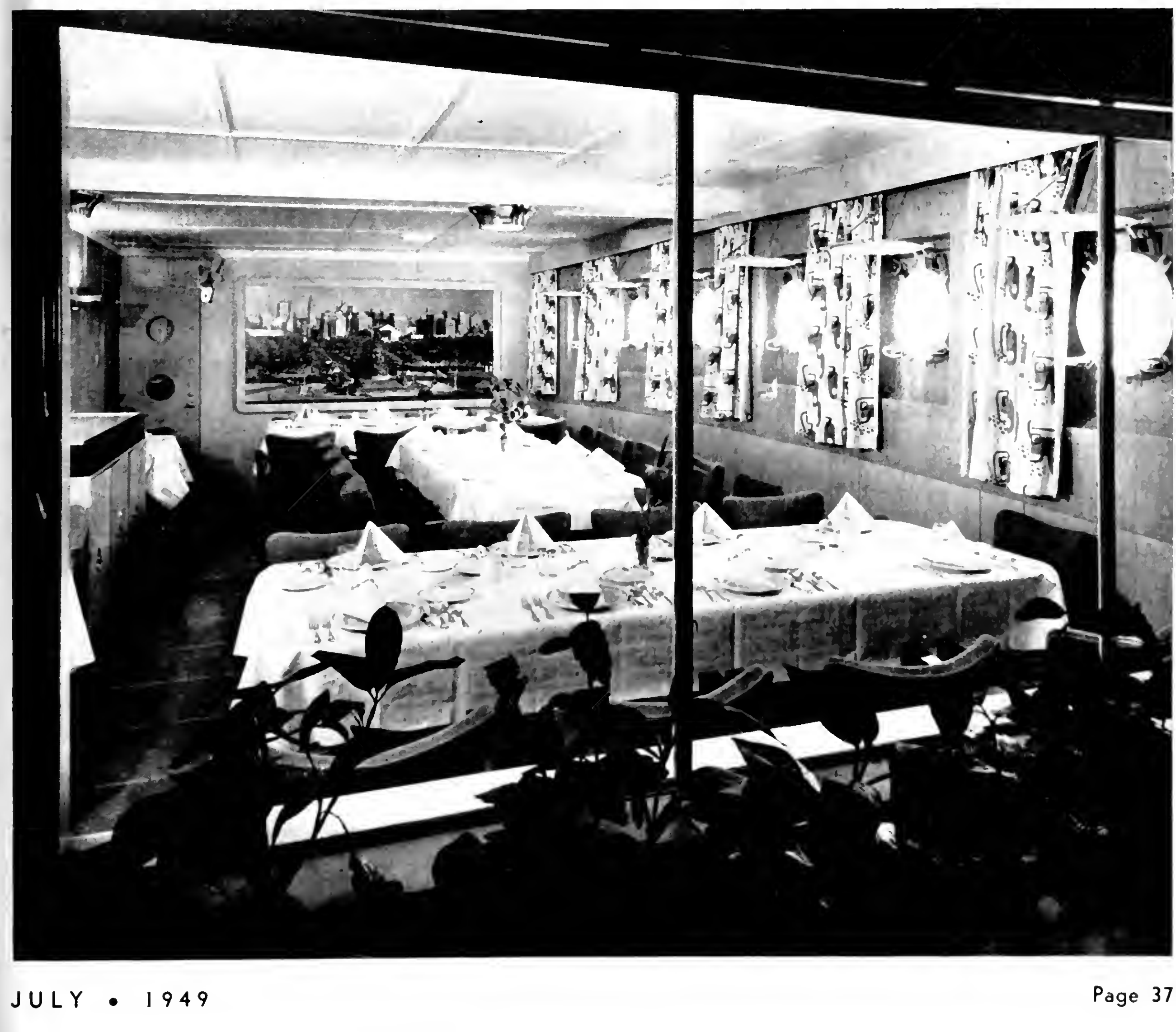
Sea Cat is now *Lena Luckenbach.*

Sea Devil is now *Harry Luckenbach.*

—and they become a part of the history of the great shipping organization.

In 1850 a little tugboat named *Bluestone* plied the waters of Roundout Creek, Roundout, New York. The captain of this tugboat was Lewis Luckenbach and the engineer, his brother Edward. From this small beginning the present splendid fleet of modern freighters owned and operated by Luckenbach Steamship Company evolved. Many interesting and exciting experiences have been related in connection with the salvage operations of the Luckenbachs, from the commonplace raising of the *British Queen* off 39th Street, Brooklyn, to the recovery of the *Southery* on the then wild and treacherous Mexican Coast. These salvage operations steered a definite course toward vessel ownership and so in those days when

Main dining room looking through glass to port from the lounge on all Luckenbach C-3's.



PASSENGER ACCOMMODATIONS
(Except for detail similar on all ships)

Top to bottom:

Passengers' lounge, starboard side of ship, looking aft.

Lounge on the "Sea Devil."

Passenger's stateroom, starboard side of ship, looking aft. View showing room arranged for sleeping.

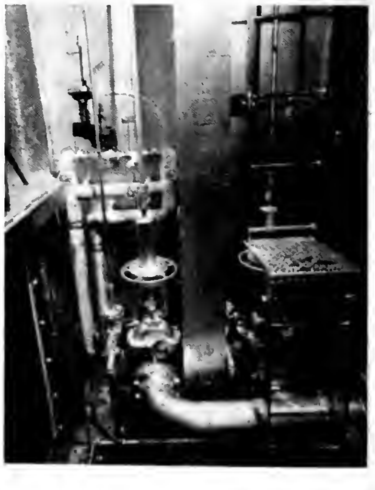
clouds of canvas billowed over the seas the iron hulled clipper ship *Tillie E. Starbuck,* the first of her type, ran up the Luckenbach colors and was off to gallant service. Her log recorded voyages to the Far East, Hawaii, and the West Coast of the United States via Cape Horn. In the latter service her record run of one hundred and six days from New York to Portland, Oregon still stands. Gradually the steamship replaced the sailing vessel and as these changes took place the Line enjoyed a steady growth.

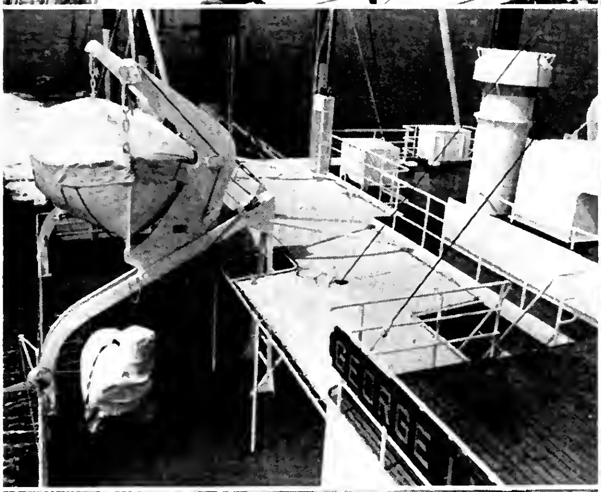
First Through The Canal

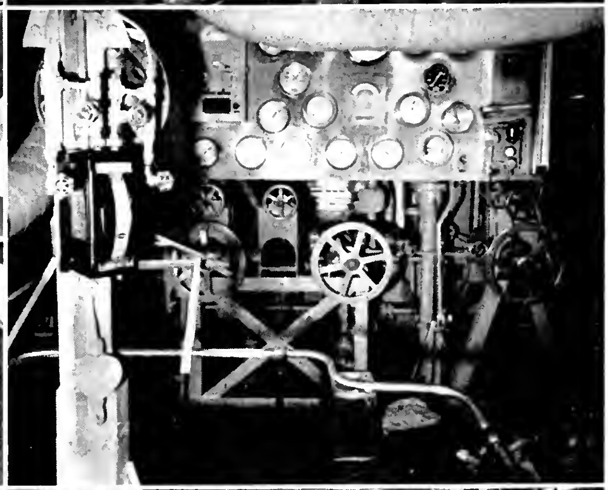
The opening of the Panama Canal in 1914 hailed the dawn of a new era in intercoastal trade and consonant with the spirit of progress of the Luckenbach Line the first commercial vessel to make the transit, laden with the products of the Pacific Coast for New York, Philadelphia and Boston, was the steamship *Pleiades* of this Line. Foreseeing the wonderful future for this trade, Edgar F. Luckenbach laid the groundwork of a magnificent fleet of cargo carriers by placing contracts with American shipbuilders in 1915 for the first vessel of this new fleet. At the outbreak of the World War, shipping stagnated but by 1916 any kind of steamship brought undreamed of prices. In 1917 upon the entrance of the United States into the War, the Luckenbach Steamship Company turned over to the United States Government a fleet of five ocean-going tug boats and nineteen ocean-going coal barges and in addition, the vessels of the Line were placed in the transatlantic run carrying war materials and supplies. In all 123,040 gross tons of Luckenbach shipping engaged in the armed service of the Government. Of these the steamers, *Lewis Luckenbach, Jacob Luckenbach, Harry Luckenbach* and *Dorothy Luckenbach* were sunk or destroyed in naval engagements and the *J. L. Luckenbach,* severely crippled, was rescued by destroyers after a four hour engagement with a German U-boat in which she covered herself with glory. This encounter is interestingly described in a work of Rear Admiral William Snowden Sims, U.S.N., titled "The Victory at Sea".

At the termination of World War I, the Luckenbach vessels were converted into troop carriers and thousands of our soldiers were returned to their homeland in these

In the edible oil tank control room, Leslie valves regulate steam to heating coils in the tanks and are adjustable to keep steam pressure and temperature constant.







Top: View of extended bridge deck from main deck showing Kearfott windows. All seven Luckenbach ships have Kearfott windows in wheelhouse and staterooms.

Center: Welin davit on the "George Luckenbach."

Bottom: Vertical lining in cargo hold. This is intended to avoid damage to cargo resulting from horizontal battens.

Top: View of control room for edible oil tanks showing Leslie valve in center.

Center: Main control board on "Sea Devil" at Moore Dry Dock Company's yard. Yarway water level indicator shown at left was one of new installations in the conversions. The "Sea Devil" is renamed the "Harry Luckenbach."

Bottom: Coffin pump installation on "Sea Bass," also at Moore's. The "Sea Bass" is now the "William Luckenbach."

James Sinclair
President of Luckenbach

Vincent McMurdo
Pacific Coast Manager

M. J. Ryan
Naval Architect

vessels. As the adjustment of these conditions progressed, the vessels of the Luckenbach fleet were returned by the Government and in 1920, recognizing the value of an express sea service, the Luckenbach vessels were returned to the intercoastal trade, in which trade the company had the finest fleet of fast freight steamers under the American flag. This fleet connected United States Atlantic and Pacific ports in one service and the United States Gulf and Pacific ports in another service. In the years prior to World War II the fleet grew to a total of twenty-three vessels which were operated on a weekly basis in the Atlantic trade and fortnightly in the Gulf trade, with extra vessels being placed on berth in both trades as conditions required.

Top: Capt. M. Jurkops, port captain for Luckenbach at Seattle; Capt. W. R. Brust of the "George Luckenbach"; Ed Ramey, superintending engineer for Luckenbach on Pacific Coast.

Bottom, left to right: B. C. Beach, Ira Whidden, Jim Greig, Dan Nilan and Jim Brunero, all of the staff of Naval Architect M. J. Ryan.

The twin giants of the American Merchant Marine, the steamers *Andrea F. Luckenbach* and *Lewis Luckenbach,* were the largest freighters under the American flag. With a length of 496 ft., a beam of 68 ft. and a deadweight carrying capacity of 14,400 tons, they were the largest and fastest freighters in the intercoastal trade. During World War II all twenty-three vessels of the Luckenbach fleet "went to war in Uncle Sam's service." A number were lost from enemy action in various parts of the world, four of them during the month of March, 1944. One is still on the Normandy beach where she, with other vessels, was sunk to make artificial harbors for the safe landing of our troops in France. Others were requisitioned by title to the Government for various purposes, one of which became a mule carrier, and two others were converted into hospital ships. After the last shot was fired and the Government began redelivering the vessels to the owners, only nine of the original twenty-three turned over to the Government at the outbreak of the war were returned to the company. Of the remaining vessels, five have since been sold, which leaves but four of the old fleet still on hand.

For the future, purchase arrangements were entered into with the Government for a total of eleven C-3 type and five C-2 type vessels intended for the intercoastal trades. All of these vessels have now been delivered to the company and for the present are in foreign service.

Edgar F. Luckenbach passed away in 1943 but the ownership remains wholly within the Luckenbach family and the continuance of the policies which have made the line one of America's outstanding and forward looking shipping companies through 99 years is thus assured.

"C-Coaster"

— Chamberlin Coastwise Lumber Traffic Restored

IN a determined effort to restore coastwise lumber operations with which they have been associated for 33 years, W. R. Chamberlin & Co. have purchased a wartime LSM and have had Commercial Ship Repair, Inc. convert the vessel to lumber handling requirements. In the process they have come up with what looks like a real answer to the problem, and have named their vessel the *C-Coaster.*

The MS *C-Coaster* is a twin screw, 3,600 h.p. Diesel powered vessel with an operating speed of approximately 12 knots. She is 203′6″ over-all and has a 34′ beam, and has a complement of 19 men. Particular cognizance should be given her draft which is 9′6″ fully loaded and only 4½′ light. Consequently, she will be navigable in practically any waters on the Pacific Coast.

The M.S. *C-Coaster* will be able to carry 525,000 bd. ft. of rough lumber or 650,000 bd. ft. of surfaced lumber, which is a capacity cargo for the vessel and is a very desirable cargo. It does not over-tax the mills or the yards and obviates filling up yards with unsold inventory.

It will take an estimated 6 hours-plus to load and 6 hours-minus to discharge her. Her running time will be, Coos Bay to San Francisco—30 hours; Coos Bay to Los Angeles—56 hours.

She will be able to offer to the lumber industry speed in the delivery of special orders, enabling lumber yards in Los Angeles or San Francisco to take delivery of special orders within three days after placing those orders with the mill.

She is the only contract carrier that can take full lumber loads out of ports on the Pacific Coast whose controlling depth is as shallow as 10 ft.

Insurance is included in the Tariff and less than cargo lot loads are acceptable.

There is no gear on her converted decks as she loads and discharges entirely by shore-side or floating cranes. Loading and discharging is strictly a *Package Operation.* Prior to loading, the lumber will be assembled in stacks of equal lengths and widths, preferably strapped securely with either steel strapping or wire. However, unstrapped slingload lots will be acceptable. The approximate maximum size of such a package will be 3,500 bd. ft.

The vessel will carry about 700 Rochester wire rope slings, by which packages will be loaded aboard. Once in place, sling and package remain as is until completion of the discharging operation, at which time the slings are re-loaded aboard the vessel for the next southbound voyage. It is contemplated that packages in excess of 12 ft. in length will be lifted by two slings, thus decreasing possible damage to the cargo and danger in the loading or discharging operations. By this method, the necessity of handling separate pieces of lumber by hand (which has been customary) is eliminated, resulting in time saved and reduction of vessel operational overhead. This saving of port time during loading and discharging operations is passed on to the shipper or consignee in the form of quick turn-around voyages, which will result in a greater ease in fitting the ship into production schedules at the mills, while maintaining continuing rapid delivery to the yards.

W. A. Chamberlin and W. R. Chamberlin, Jr.

Radar is Great Help

In addition to other modern safety precautions taken, the M.S. *C-Coaster* is equipped with Westinghouse marine radar, and is also equipped with R.C.A. Ship-To-Shore Telephone.

That the radar was a good idea is proven by the fact that on her maiden voyage, the *C-Coaster* was loaded with lumber at Coos Bay, Ore., and while visibility in the Bay was "zero", W. R. Chamberlin, Jr., reported, the *C-Coaster* with the aid of her radar, was able to leave on schedule—the only vessel in the harbor which did so at that time.

One of the exclusive Westinghouse features of this unit is the self-supporting completely enclosed type of antenna. All of the vulnerable points of the rotating an-

LSM before rebuilding into "C-Coaster."

tenna are completely protected against wind, weather and flying objects by an enclosing plastic Radome. This design permits the use of a solid antenna reflector of greater efficiency, eliminates all rotational speed variations due to wind; prevents damage by moisture, and offers a safety factor against injury to personnel and antenna damage. In many operating areas the antenna may be subjected to severe icing conditions. This adds to the physical loading of the mechanical elements, distorts the radar beam, and reduces the efficiency of transmission and reception. By virtue of the enclosed design, infra-red heaters may be installed to prevent ice from forming on the protecting dome, thereby preventing these hazards.

The Engine

The Fairbanks-Morse Model 38D-8-1/8 opposed piston engines in the *C-Coaster* are the 10 cylinder model, having a bore of 8-1/8" and a stroke of each piston of 10". The Navy rated the engines at 1800 HP in the LSM application, but the normal commercial rating for the engines is 1600 HP at 720 RPM. In submarine service similar engines have been rated as high as 2000 HP.

The opposed piston engine is radically different from conventional engines. It is an engine without cylinder heads or valves. The only working parts are the cylinder and pistons. The engine uses a plain open-end cylinder, in which two pistons operate from either end. The engine has two crankshafts, one at the top and the other at the bottom of the frame, which are connected together by a vertical shaft and beveled gear drive.

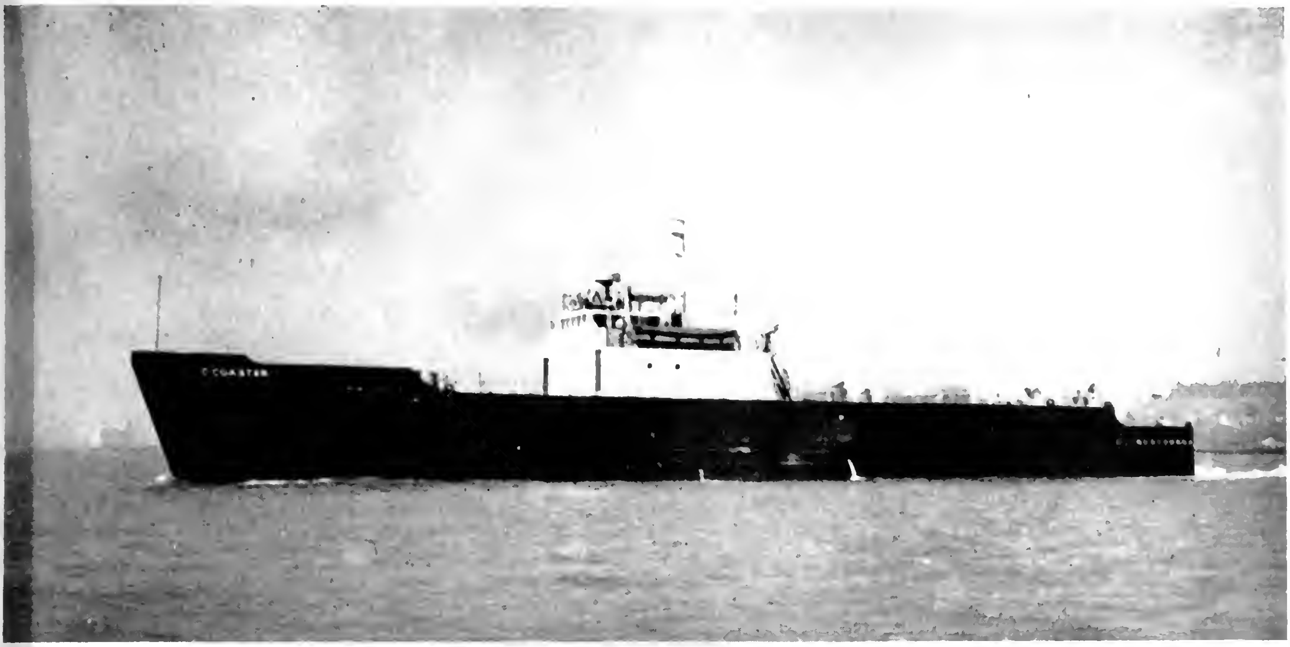
There are two pistons in each cylinder connected by their respective connecting rods to the upper and lower crankshafts. The pistons alternately move inward to the center of the liner where the combustion takes place at inner dead center, and then the pistons move outward under expansion of the burning gases on the power stroke.

At the end of the power stroke, the lower piston first opens the exhaust port, relieving the exhaust pressure from the cylinder. The upper piston then opens the scavenging air ports through which air is supplied by the rotary scavenging blower. The air is blown through the cylinder, completely scavenging the exhaust gases and recharging the cylinder with a clean supply of fresh air. The scavenging blower delivers nearly 50% more air than the total displacement of all of the cylinders in the engine.

Each cylinder has two injection pumps and two injection nozzles, injecting the fuel at opposite sides into the combustion space between the pistons as the pistons approach each other at inner dead center at the end of the compression strokes. Operating at 720 RPM, the engine has 10 power strokes per revolution, or a total of 7200 combustion strokes per minute. The power strokes overlap each other so closely that the power output of the engine is extremely smooth and no flywheel is required on the engine.

On the trial trip, the extremely smooth operation of the vessel was particularly noticeable. Many of the guests commented on the absence of vibration in the hull from the engines.

The engine is built with an all welded steel frame and is entirely free from castings used in ordinary engines. The frame is welded from heavy steel plate and after welding is completed, the entire frame is placed in a large oven and heated red hot to relieve all welding strains. The frame is then magnefluxed and completely checked before machining. The steel frame construction



"C-Coaster" making about 12 knots on trial run.

combined with the opposed piston design provides an engine of maximum strength and maximum horsepower, with a minimum of space and weight. One engine rated 1600 HP weighs approximately 38,000 pounds, or almost 100,000 pounds less than the conventional slow speed diesel engine construction.

Removable cylinder liners, which incorporate the water jacket and liner in one piece, are slipped into the all welded frame and can be easily removed if replacement becomes necessary. The water jacket is part of the

Forward hold of M.S. "C-Coaster."

After deck of "C-Coaster." Wire rope used for bundling the lumber. A replacing set of rope coils goes back with the vessel.

liner assembly, to which water is carried by screwed connections. At no time does any water come in contact with the main frame of the engine. There will never be any rust or corrosion of the frame from the jacket water system. Closed fresh water cooling system is used with cooling water pumps mounted directly on the forward end of the engine and driven from the crankshaft. The pistons are completely oil jacketed and cooled with lubricating oil, carried to the pistons through drilled connecting rods. The entire crown and sidewalls of the piston are completely oil jacketed to maintain the piston temperatures at correct value. This thorough cooling of the pistons completely frees the engine of ring sticking, and absolute control of the temperatures of the pistons reduces cylinder and piston wear.

The engines are of the direct reversing type. This is probably the only engine within the horsepower and speed range, incorporating this feature. Similar engines of other design require the use of reversing gear, which adds weight and complications to the drive.

The LSM class of vessel was designed principally for operation in shallow water. This required the use of small diameter propellers, and, therefore, the engines are coupled for direct drive with the propellers at full 720 RPM without the use of reduction gears. The drive from the engine to the propeller shaft is through an American Blower Company hydraulic coupling, which is built in combination with a separately mounted thrust bearing assembly. The hydraulic coupling provides a smooth torque for the engine to the propeller shaft, and at the same time, provides some cushion effect should the propeller strike bottom in shallow water. The coupling can be entirely drained by small electric-driven pump, completely disconnecting the engine from the propeller shaft. With two engines installed, one engine would drive the vessel at approximately 70% of full speed without over-loading. It would be possible to shut one engine down in emergency without upsetting the schedule too badly, or it would even be possible to overhaul one engine without tying up the vessel, by carrying out normal overhaul work on one engine at a time at sea, while the opposite engine keeps the vessel in service.

A Fawick pneumatically operated air brake is applied

Scanning the scope of the Westinghouse radar on the "C-Coaster," is T. L. Tomlinson, right, marine superintendent for the W. R. Chamberlin Co. Watching him are W. R. Chamberlin, Sr., left and Captain C. H. Anderson, skipper of the "C-Coaster."

FAR LEFT

Top, left to right: W. R. Chamberlin, W. R. Chamberlin, Jr., Andrew J. Lynch, Allen K. Hulme, W. J. Mitchell.

Center, left to right: Hal Camman, Commercial Ship Repair; Al Safholm, Coastwise Lines; A. S. McNeil, Commercial Ship Repair; R. Stephenson, U.S.A.T.

Bottom: H. G. Nagel of Fairbanks-Morse and T. L. Tomlinson of W. R. Chamberlin & Co.

LEFT

Top: Radiomarine in action. Harvey R. Butt watches J. F. Parachini telephone ashore.

Bottom: W. R. Chamberlin, Sr., right, of the W. R. Chamberlin Co., scans the scope of the Westinghouse radar on the "C-Coaster," while his son, Dick, Jr., watches.

Discussing marine radar under the self - supporting completely enclosed antenna of the "C-Coaster's" Westinghouse radar are A. A. Eggum, left, and W. R. Chamberlin, Jr., of the W. R. Chamberlin Co.

to the propeller shaft to quickly stop the propellers during maneuvering periods. This air operated clutch is controlled electrically from a limit switch on the engine maneuvering handle and by a manual control switch on the instrument panel. The operator may engage or disengage the brake control at his option.

The main engines have been completely overhauled under the direction of the Fairbanks-Morse Service Department at San Francisco. The past record of these engines in Navy service, particularly in submarine service, gives every indication that the *C-Coaster* will be able to operate economically and continuously.

Two Auxiliary Diesels are General Motors

The vessel is also equipped with two electric systems, A.C. and D.C., enabling the vessel to completely shut down her plant and draw power from her dock to facilitate maintenance of engines.

Vessel has been completely re-wired in accordance with Coast Guard specifications; fire hydrants and ventilators have been re-located and re-piped, so that a maximum of vessel's deck space could be used for lumber, and at the same time conforming with Coast Guard, A.B.S. and Public Health Department requirements.

Anti-Fouling Paint

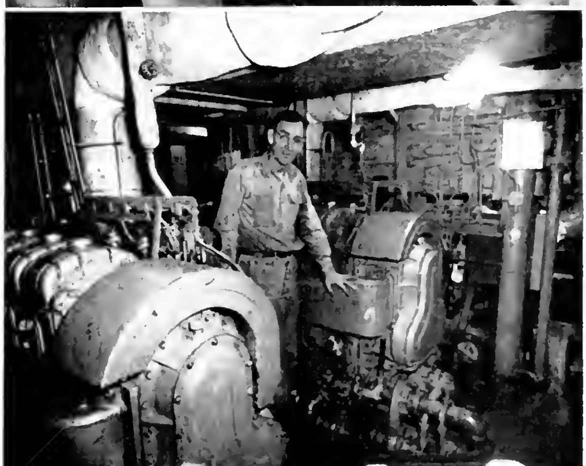
The steel hull below the water line has been protected against corrosion by Americoating. First, the hull was sandblasted from the deep load line to the keel and then given three coats of plastic anticorrosive. The first coat was brushed on, and the other two coats sprayed on. The material came ready to apply and went on as fast as paint. Alternate colors were used to insure complete coverage for each coat. A final coat of boottopping was put on above the light load line, and one coat of Amercoat's special formula antifouling was sprayed on the bottom. Amercoat dries quite fast, the vessel being on dry dock only 48 hours including the sandblasting time. Edgar Martin Co., San Francisco, furnished the Amercoat.

The vessel's gross tonnage is 739, net 359. Cost of the completely reconverted ship is about $180,000.

Top: Wheelhouse of "C-Coaster." Ole Grandy, second mate is shown here.

Center: William B. Burnell, Chief Engineer of "C-Coaster" with two GM auxiliary Diesels. Generators are Westinghouse 100 KW.

Bottom: Starboard. Fairbanks-Morse Opposed Piston Main Diesel. John G. Kelly, superintending engineer, W. R. Chamberlin & Co. is in this picture.



The Army Dredge "A. MacKenzie"

COMPLETELY repowered and repaired, the Corps of Engineers twin-screw, diesel-electric, sea-going hopper dredge *A. MacKenzie* has again resumed harbor dredging operations which in the past have extended along the Pacific Coast from San Diego to St. Petersburg, Alaska, and overseas as far west as Okinawa.

The *MacKenzie* has an overall length of 268 feet, 5 inches; a breadth of 65 feet over drag pipes; a molded beam of 46 feet; and a molded depth of 22 feet 6 inches, to the main deck. She displaces 3,066 long tons light and 5,316 long tons loaded. The vessel was built in 1924 at Sun Shipbuilding & Drydock Co., in Chester, Pennsylvania, and brought to the West Coast two years later where she dredged channels, bars, and worked in all the larger ports on the coast all the way up to Alaska.

On December 7, 1941, the *MacKenzie* was in San Francisco, having just returned from Midway where she had dug a channel through a coral reef making it possible for vessels to enter the lagoon at that island. For the next four months, she operated at Long Beach, California, then returned to San Francisco to perform dredging operations on the San Francisco bar.

In August, 1943, she left for Honolulu, Midway and Funafuti. From Funafuti, she returned to Honolulu for repairs, then went to Saipan, Tinian, and Guam for further dredging operations. On V-J Day, the *MacKenzie* was at Guam. Ten days later, she left for Okinawa to dredge in Naha harbor.

It was while this work was going on that machinery failure forced her to return to Buckner Bay. Here, on October 9, a furious typhoon struck, tearing the *MacKenzie* from her moorings and hurling her on a reef. Three holes were torn in the vessel's starboard side below the water line when she struck a derrick barge before piling up on the reef.

She remained on the reef for 12 days before being pulled off and drydocked for temporary repairs. She

"A. MacKenzie" shown at the San Francisco yard following a complete repowering and reconditioning job.

was then towed back to Honolulu and subsequently to San Francisco Bay where she was berthed at Marinship, Sausalito, California, until December 9, 1948.

While at Marinship, the vessel's machinery was removed because it was damaged beyond economical repair, and it was decided to replace it with a more modern type machinery which was surplus to the Navy Department's needs. This machinery consisted of four main and three auxiliary Diesel-driven generator sets, two propulsion motors, many auxiliary pumps, a hydraulic steering gear, and other electrical equipment, all of which was completely overhauled.

Complete plans and specifications for repowering and repairing the dredge were prepared by Corps of Engineers marine personnel, under the direct supervision of H. D. G. Baxter, Head Engineer in the Corps of Engineers South Pacific Division Office, Oakland, Cal. Baxter is also a member of the Hopper Dredge Board, Chief of Engineers, Washington, D. C.

For the past six months, this vessel has been at the San Francisco Yard of Bethlehem Steel Company, Shipbuiding Division, where all her main and auxiliary machinery was replaced, all operating mechanism overhauled, new quarters installed to accommodate her engineer officers, and many other miscellaneous items in this major reconditioning job performed. The work was performed and administered under a contract executed for the U. S. Government by Colonel S. N. Karrick, District Engineer, San Francisco District, Corps of Engineers.

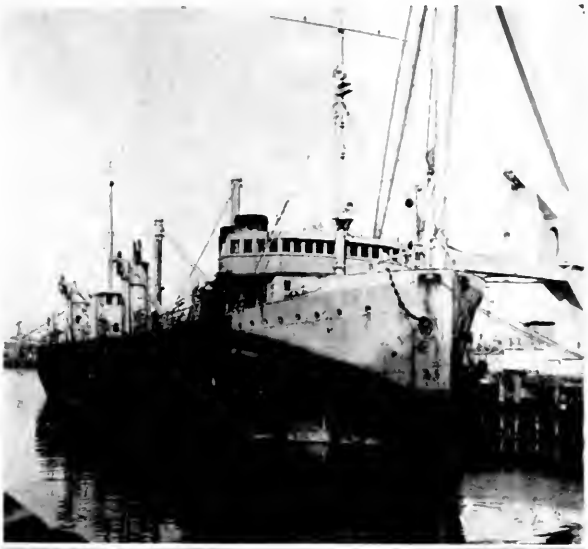
The dredge was delivered to the Bethlehem yard completely devoid of old engines, machinery and pumps. Bethlehem ripped out all the old engine and pump foundations and installed new ones to accommodate the new machinery. The dredge pump was moved from the port side of the forward engine room to the centerline. The main switchboard was removed from the dredge and this, together with additional parts furnished by the Government, was reconstructed into one commonly powered main distribution switchboard.

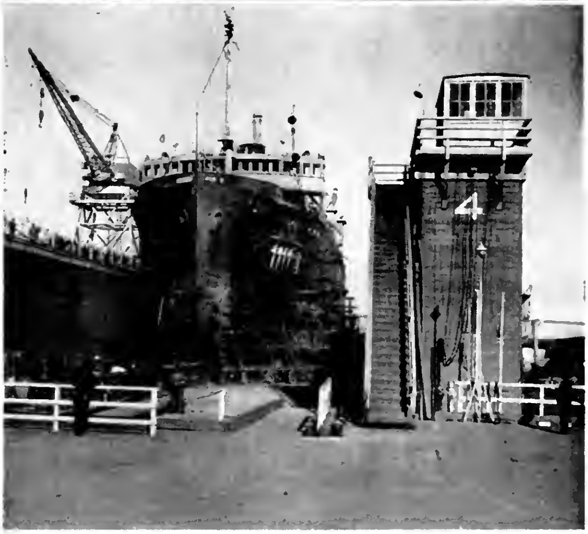
The *MacKenzie's* old stern tubes were removed, the hull castings and struts bored out, and new stern tubes, shafts, and propellers were installed to accommodate the increased horsepower of the vessel.

Because of the smaller size of the new Diesels, more room was available on the main deck level forward of the engine room. This space was utilized for new quarters for the vessel's engineer officers.

The first step in the program of rehabilitation of the *MacKenzie* was to drydock the vessel and sandblast her to bare metal. When this was done, it was noted that several plates had deteriorated. The entire vessel was then drill tested, and a total of 92 shell plates renewed.

Auxiliary power throughout was changed from 240 volt D.C. to 440 volt A.C. This necessitated remotoring and recontrolling all ventilation systems, deck winches, and anchor windlasses and capstans. Deck machinery





Top: The "MacKenzie" as she looked when she first entered Bethlehem's San Francisco Yard.

Bottom: The "MacKenzie" on drydock at the San Francisco Yard while sandblasting and shell plate repair operations are in progress.

was remotored with Westinghouse motors. In addition, a new 5-ton Markey A.C. deck winch was installed for handling the heavy drag gear. Four new crescent type Welin davits on the after starboard side of the weather deck also were installed, together with a new electric boat winch. New pumps and compressors are mostly Worthington and Ingersoll-Rand.

The entire superstructure, engine rooms and quarters were completely painted throughout. The entire hopper area was sandblasted to bare metal and a bituminous coating applied. International Cold Plastic anti-fouling bottom paint was used. Before this part of the job had started, inspection revealed a *live* 40 mm shell which had become lodged in the hinges of one of the hopper doors. This shell had probably become stuck in the

The "MacKenzie" (far left) on the reef at Okinawa. At least 12 other wrecks, the result of both war and typhoon, appear in this picture, which was taken from shore by Capt. Heil, as were also those at top of next page.

hopper during dredging operations in the South Pacific during the war. Removal of the shell was accomplished by Colonel P. R. Dodge, U. S. Sixth Army Ordnance Officer, assisted by B. Arbaugh of the San Francisco District, Corps of Engineers.

In connection with the *MacKenzie's* hoppers, a single experimental type conical hopper gate was installed.

Returning to the *MacKenzie's* main propulsion and dredge pump machinery. The horsepower of each screw was increased from 800 to 1,200. The dredge pump requires 900 H.P. Her shaft horsepower, formerly 1,600, now is 2,400 total for both shafts.

She has four General Motors diesel engines, each driving a 1,200 KW generator. Two are for main propulsion, one for driving the dredge pump, and one as a spare. Two are in the after engine room and two in the forward engine room.

She has two Westinghouse main propulsion motors of 1,500 HP each driving their respective propellers through Farrell-Birmingham single reduction gears. She also has two 200 KW auxiliary generators; one 100 KW emergency generator, and one 60 KW emergency generator. The power plant was designed so that any two of the four main generators can be used for propulsion, although only any one of the two in the forward engine room may be used for driving the dredge pump.

An interesting feature of the *MacKenzie* is that its main propulsion plant can be controlled directly through the wheel house. Steering gear is McKiernan & Terry.

The main 45 ft. long switchboard for the control of the propulsion, power and lighting circuits was completely modified and rebuilt in the Westinghouse Emeryville Manufacturing and Repair shop. The new switchboard and propulsion design were developed by the Westinghouse San Francisco Engineering and Service Department. Westinghouse also supplied the new pilot house control.

In addition to the switchboard, the 900 hp, 1500 ampere, 480 volts, 152 rpm, Westinghouse dredge pump motor was completely overhauled and reinsulated in the Emeryville M & R shop. This was necessary since the dredge was partially submerged at Okinawa during the typhoon in 1945.

The original direct current electrical deck equipment was replaced with Westinghouse 440 volt, three-phase, 60 cycle wound rotor motors:

(a) Capstan—two 20 horsepower, 720 rpm, drip proof motors,

(b) Anchor Windlass—one 25 horsepower, 600 rpm, water-tight motor and rectox-operated magnetic brake,

(c) Cargo Winch—one 15 horsepower, 900 rpm, water-tight motor with rectox-operated magnetic brake.

Two 200 KW, three phase, 440 volt, 60 cycle Westinghouse generators supply the power and the lights on the dredge. The twin screws are each driven by a West-

Top: The "MacKenzie" in drydock for temporary repairs after 12 days on the reef.

Center: Scene of wreckage on reef and beach, viewed from the dredge.

Bottom: One of the holes punched in the "McKenzie's" hull below the waterline by a drifting derrick barge.

inghouse 1500 hp, 600 rpm, 2200 ampere, 525 volt DC propulsion motor. The steering gear is powered by two Westinghouse 5 hp, 440 volt, three-phase induction motors.

Each screw can be independently controlled either in the pilot house or engine room.

All the *MacKenzie's* operating mechanism, including hydraulic cylinders, water tight doors, and drag hoists, were completely overhauled and all standing rigging renewed. New Sperry radar and Bludworth fathometer have been installed, as well as a ship-to-shore telephone system.

The entire vessel was rewired. This included new light wiring power panels, etc. New ceramic tile was installed in all washrooms, and four new fresh water tanks of 2,500 gallons each were added. Two of the existing fresh water tanks were made into Diesel fuel oil tanks.

The ship successfully passed a 2-day sea trial, which included standardization of the vessel at four different RPM—approximately 50, 90, 120, and 125 under both light and loaded conditions. The dredge pump was operated, the hoppers filled, and a test of the new type hopper door conducted. Average speed both ways over a measured mile in light draft condition was 12.4 knots. Average speed under loaded draft condition was 10.9 knots. Maximum horsepower indicated as delivered to the propulsion motors was approximately 2,900 HP for both screws. Also, the ship was inclined in both light and loaded condition.

Skipper of the *MacKenzie* is Carl Heil, who went to sea in 1924 and joined the Army Engineers in 1929. Heil's home is in San Francisco. He joined the *MacKenzie* as a Quartermaster and was made Master of the vessel in September 1944 while in Saipan.

F. E. Sandstrom has been Chief Inspector for the Corps of Engineers during the time of the *MacKenzie's* stay at Bethlehem Shipyard. He is a Chief Engineer of long standing, having received his first license in 1921. He joined the Corps of Engineers in 1940 as Chief Engineer on the dredge *Holland*, then transferred to the *MacKenzie* from which job he took over his present duties.

W. Adams is the Chief Engineer on the *Mackenzie*, having been transferred to this job from the Corps of Engineers' dredge *Davison*.

The dredge is now operating 24 hours a day on the Sacramento River above the Carquinez Straits.

Top: F. E. Sandstrom, Assistant to Marine Operation Section, Corps of Engineers, Carl Heil, Skipper, and William Adams, Chief Engineer, inspect the new pilot house engine control on the Dredge "A. MacKenzie."

Bottom: Tom Curry, Fire Chief at Bethlehem's San Francisco Yard, examines live 40 mm shell found lodged above hopper gate hinge on "MacKenzie."

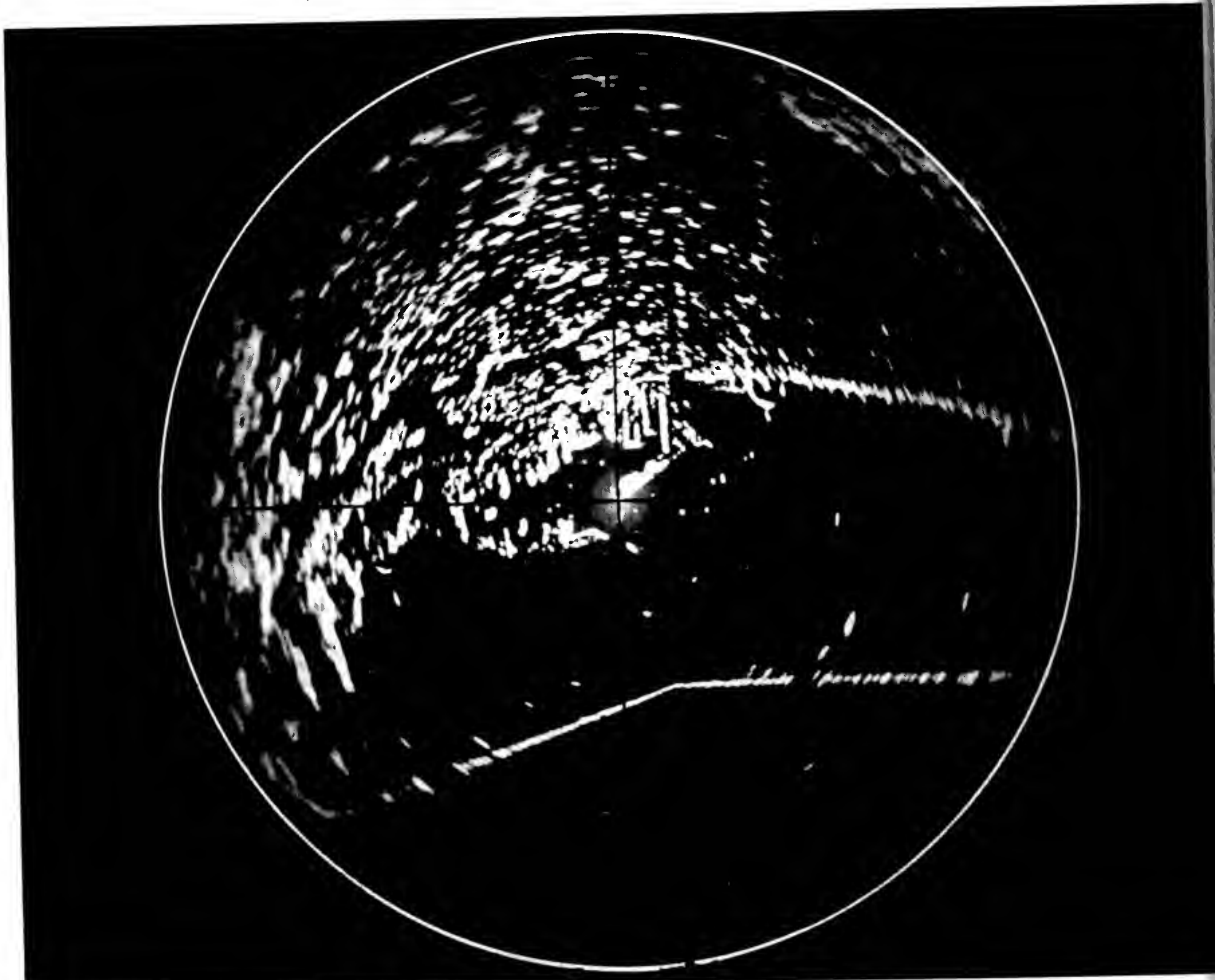
How Harbor Radar Works

MARKING a major advance in navigational aids, the Port of Long Beach, California, announces the installation of the first port radar control system in the western hemisphere. The principal object in establishing such a radar control station is to provide a safe medium for the movement of shipping in and out of the port during periods of low or zero visibility and to serve as an aid to the pilotage of ships in and about the harbor. Port officials are confident that this installation will entirely eliminate the costly necessity of ships lying offshore while awaiting the lifting of heavy fog banks which occasionally roll in from the sea.

The radar equipment, furnished by the Sperry Gyroscope Company, has been installed in the Port of Long Beach pilot station located at the southernmost tip of Pier A in the Long Beach Outer Harbor, and the radar scanner is mounted atop a 122-foot steel tower located alongside the pilot station.

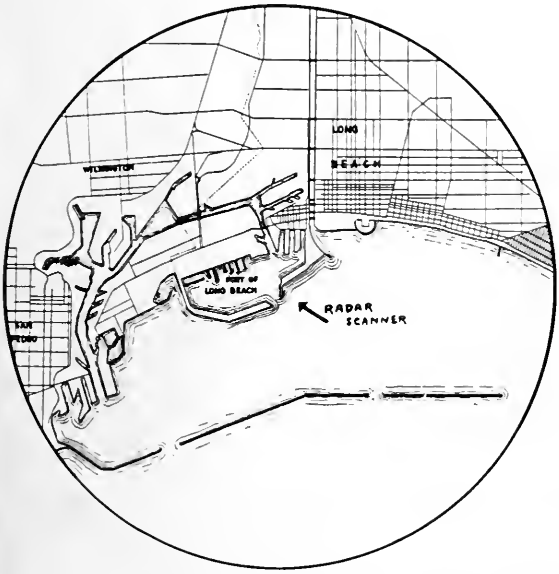
With such radar control it is possible to observe and locate all ships within a distance of 30 miles from the pilot station. The port pilots will carry walkie-talkie radios as they board ship and will be in direct contact with the pilot station at all times through the medium of radio transmitter-receiver sets located in the pilot station. The pilot boats will also carry transmitter-receiver sets and complete radio contact will thus be

A photograph of the viewing scope of the Port of Long Beach radar station in operation. The photograph does not bring out the clarity as it actually exists on the scope.



maintained at all times between the dispatcher in the pilot station, the pilot boats and the pilots.

The procedure to be followed corresponds closely with the Ground Control Approach System for aircraft where the pilot of the approaching plane is "talked down" to within 50 feet of the center of the runway. In like manner, the Port of Long Beach radar control station operator will contact the incoming ship after the port pilot has boarded that vessel, having been directed to the ship by this same radar installation, and will then maneuver the incoming ship into position for an approach down the entrance fairway, track it in range and bearing, and guide the pilot into the harbor and to the proper berth.



A map of the same area as that shown on the viewing scope, showing the exact detail with which the radar installation reproduces the surrounding area.

This radar control will be accurate to the same tolerance allowed in the radar approach system for aircraft and is certainly less critical for an approaching ship than for an approaching aircraft.

Permits have been issued by the Federal Communications Commission for the operation of the equipment, the radar operating on a frequency of 9320-9430 megacycles and the radio operating on a frequency of 156.80 megacycles.

The installation is being made by the Port of Long Beach as a service to the shippers using the port and there will be no additional charge for its use. Surveys have been made of various shipping firms and these surveys indicate that savings resulting from the elimination of vessel delays and the resultant standby time paid stevedore gangs may run into large figures.

Inasmuch as this provides a totally new method for the operation of ships in and out of a harbor, it is the intention of the port to proceed cautiously and operate the equipment for some time on an experimental basis. However, engineers and shippers alike are confident that it will prove to be entirely successful and will, within a relatively short period of time, be an integral and necessary adjunct of any modern port.

This history-making project had it inception back in August, 1947, when the Sperry Company presented an engineering proposal to the Long Beach Harbor Commission, outlining a complete harbor supervision system.

Subsequent talks between Sperry representatives and members of the Harbor Commission culminated in a visit to the Sperry plant and a demonstration of the radar installation at Seamen's Church Institute, near the Battery in lower Manhattan. Here, with busy New York Harbor lying under the scanner of the radar, the potential qualities of the proposed installation for marine traffic assistance were fully realized by the Commission members.

A specific test was arranged for the visitors from Long Beach in this way. The tower of the parachute jump at Coney Island was selected as a radar reflector. First the relative position and distance of the tower from Seamen's Church Institute were plotted on a scale map. The distance was found to be exactly 7.1 miles.

The radar then was placed on the 15-mile range and the variable range-marker was moved to 7.1 miles. The image of the parachute tower exactly intersected the range-marker. The same accuracy resulted from other similar tests. As a result of these tests and the visit to the Sperry plant, negotiations were completed upon the return of the Commission members to the West Coast.

Long Beach is a comparatively new port, but even now is recognized as a major world port. In many respects it is unique. It is the only major debt-free port in the world,

A photograph of the radar tower and pilot station located at the seaward end of Pier A, Long Beach Outer Harbor.

in that it does not operate from bond issues or taxation. Its source of income is from a whole or partial interest in some 530 oil-wells which are on harbor property. The output from these wells is about 57,000 barrels of oil per day. The average income from oil is two and a half million dollars per month.

Albert V. Moore and Emmet J. McCormack.

Moore-McCormack Lines

THIRTY-SIX years ago, a partnership in maritime operations was formed by Albert V. Moore and Emmet J. McCormack, both of whom gained their first experience in New York, both having had from their early youth a deep interest in shipping and an ambition to make it their life work.

In the years that have passed since its founding the company has operated ships to ports in the British Isles, India, and Caribbean, Scandinavian countries, Russia and South America. It has survived two wars, and during the second of these was one of the major operators of shipping, a factor of tremendous importance in the transport of men and materials to all of the areas of war, and around the world. Between the attack on Pearl Harbor and the coming of V-J Day Moore-McCormack Lines operated more than 150 ships, of which eleven were lost, and moved 754,239 troops and carried 34,410,-111 tons of cargoes.

Today, Moore-McCormack Lines Inc., the outgrowth of that partnership, operates the Pacific Republics Line between the Pacific Coast of the United States and the East Coast of South America by the way of the Panama Canal; the American Republics Line, between the East Coast of the United States and the East Coast of South America, and the American Scantic Line, between the East Coast of the United States and Scandinavia. As of December 31, 1948, it had eight foreign companies, and a fleet of forty-two ships in operation. These included thirty-four cargo vessels owned, a tanker owned, three cargo vessels chartered, one C-4 passenger vessel of which the company served as agent, and the three Good Neighbor Fleet passenger cargo liners which Moore-McCormack operates for the United States Maritime Commission between New York and the East Coast of South America.

The record of the company as it might be written to cover the thirty-six year period, is replete with achievements that loom large in the history of the American merchant marine. It involves pioneering in trade with both Northern Europe and South America, the upbuilding of trade routes which had never approached their potential until Mooremack entered its ships, and a record of transportation during the emergency of the war which is worth the pride of any operating group.

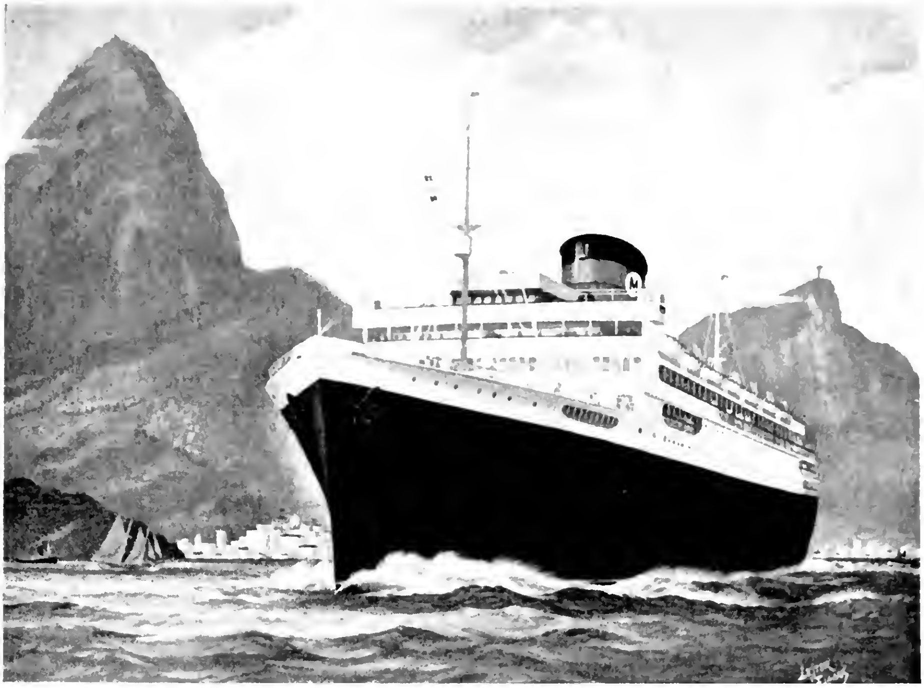
Today, the name Moore-McCormack is best known for its operations to South America from both the Atlantic and the Pacific. But, despite the fact that the company's first great pioneering effort actually was made in the South American run, its major claim to fame at the outset was in the Scandinavian trade.

Emmet J. McCormack

Emmet McCormack started as a clerk in New York's

Opposite: Moore-McCormack liner leaving the port of Rio de Janeiro. The mountains in the background are the 1300 ft. high Pao de Acucar (left) and 2300 ft. high Corcovada. The latter is surmounted by a giant statue of Christ. Corcovada means crescent, or hump. Better known is the translation of Pao de Acucar—"Sugar Loaf."

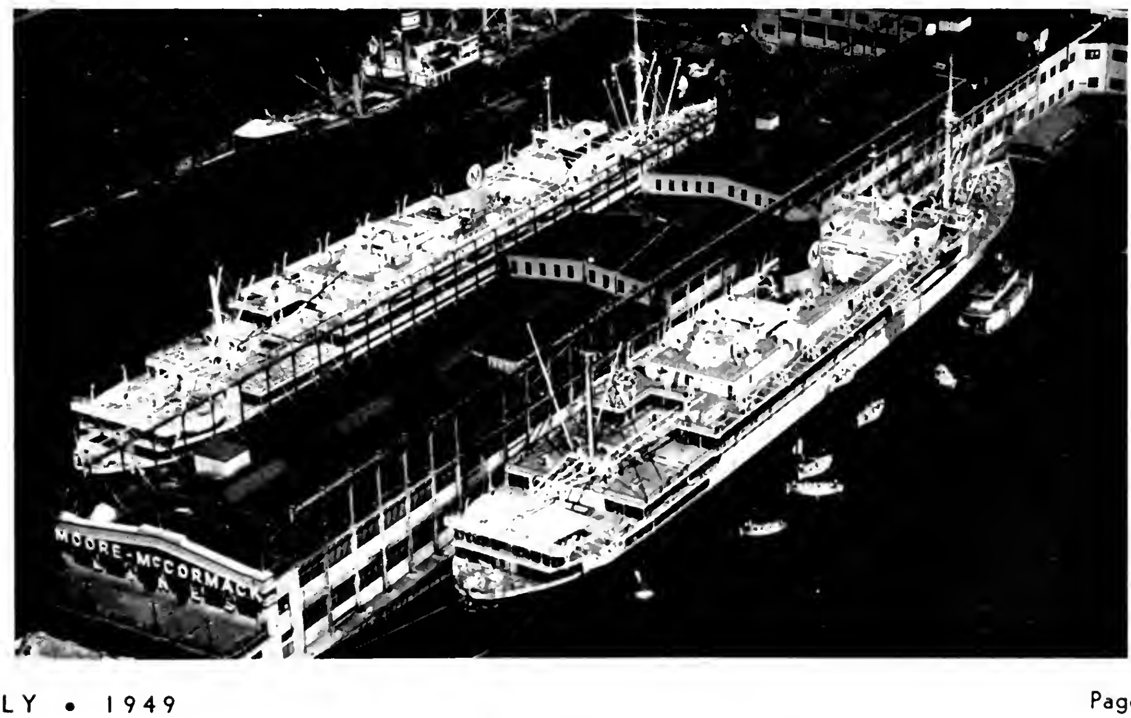
Picture below: Good Neighbor liners "Brazil" and "Argentina" at their pier in the North River.

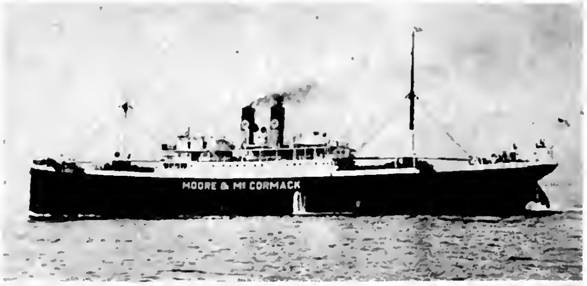


shipping district as a boy of fourteen. In his first job four different companies shared his four-dollar weekly salary—a ship's chandler, a firm that supplied dunnage to tankers, a stevedoring company and an operator of towboats. Later he went to work as a towboat deckhand, then as a solicitor of dunnage contracts from ships arriving in New York harbor, and then as a salesman of coal. He also formed the Brooklyn-Richmond Ferry Company, which operated the first ferry line that operated between Brooklyn and Staten Island, in the port of New York. At twenty-nine he became the owner of his own ship, equipped to tow and salvage which he grandly named the *America*. His business thrived and he bought a companion craft which he named for himself. His next expansion was into coal, and he formed the Commercial Company to supply to tramp ships.

Albert V. Moore

He was engaged in this work when he formed his partnership with Albert V. Moore, who had started his shipping career with Bowring & Company, owner of British ships, and then became secretary and treasurer of Tweedie Trading Company, of New York, which operated in the general shipping business, primarily as charterers operat-





Top to bottom:

The "Commercial Traveler," Moore-McCormack's only two-stacker. This vessel was used in the coastwise trade in the late twenties.

The "Southfolk," a type of vessel which Moore-McCormack used in the South American freight service.

The "Mormacrio," built by Los Angeles Shipbuilding Co. and operated by Moore-McCormack on the South American run for several years before being turned over to the Russians in World War II.

The "Mormacland," modern C-3. This type forms the backbone of the cargo fleet.

ing services to Brazil and the West Indies. The two men in 1913 formed Moore & McCormack Company, Inc., and engaged in chartering. They dispatched their first chartered ship, the *Montara,* to the East Coast of South America, and when the records were searched it developed that this was the first American flag ship to call at a Brazilian port in nearly thirty years. The company has operated ships to that part of the world ever since.

In 1919 the company sent its first steamer to the Baltic, and while the American Scantic Line as such was not organized until 1927 this sailing really marked the first operation of that service. The ship called at various Scandinavian ports eastbound and loaded a cargo of woodpulp in Finland for the homeward voyage. Through the activities of the American Scantic Line an essential American trade route was established and until the present time has been continuously maintained with the exception of the war period when it was discontinued because of the passing of the Neutrality Act.

With the ending of the first world war the company extended its activities appreciably. Continuing the South American service, it enlarged its coastal service to include the Pacific Coast, and then looked overseas for further opportunities. In 1924, when the United States Shipping Board undertook the complete reorganization of American shipping services, the newly designated American Scantic Line was turned over to Moore-McCormack for operation. In 1927, the company purchased all property of American Scantic Line.

Meanwhile the coastwise service of Moore-McCormack had been reorganized to form a link between the Atlantic and Gulf Coasts. Beginning as a route between Philadelphia and New Orleans, it grew rapidly, extending in 1927 to the newly opened port of Corpus Christi, Texas. Through this period from 1914 the company also held its place in the South American trade. In 1925, it began the operation of the Shipping Board's American Republics Line (at that time a freight service only), shifting in 1927 to operation of its own freighters.

As the twenties drew to a close, it was, however, the Baltic service which produced the most interesting developments. In 1929, even before the waterway creating the Polish port of Gdynia was completed, the company had docks and warehouses there and services were inaugurated as soon as the port was opened. The next year a growing trade with Russia was encouraged by supplementing the regular summer calls at Leningrad with winter calls at the ice-free port of Murmansk.

Further interest in the Baltic trade was evidenced by the provision of passenger facilities on American Scantic Line ships; first introduced in a limited way in the late twenties, their success resulted, in 1932, in the rehabilitation of four vessels as the "Scan" series, each providing accommodations for ninety passengers.

Through the thirties, the company's coastwise service underwent a healthy expansion, marked officially by the change in name which grouped the various routes as the Moore-McCormack Lines. In 1936, when a Mooremack-Gulf freighter opened the port of Brownsville, Texas, Moore-McCormack ships were linking the entire seaboard from New England to the Mexican border; Boston, New Bedford, Philadelphia, Baltimore, Miami, Tampa, New Orleans, Houston, Corpus Christi, Port Isabel and Brownsville were all ports of call.

The major development of the company in the thirties, one that was destined to strengthen it even more as the major operator of shipping between the United States and the East Coast of South America, involved the forma-

tion of a new American Republics Line. The Good Neighbor policy had been formulated, and with the tightening of political conditions and eventual coming of war in Europe, the importance of trade within the western hemisphere became greater than ever before. It was considered timely to enter first class passenger ships in the route between the United States East Coast and the ports of Brazil, Uruguay and Argentina, also the speeding up of the cargo-carrying service. This planning came to a head in 1938 when the Maritime Commission announced that it was prepared to accept bids for the operation of a new American Republics Line service between the U. S. East Coast, using the three big, former Panama Pacific Line passenger ships. These three vessels, well known to the Pacific Coast during their years of operation in the intercoastal service, were extensively rebuilt and redesigned for the South American run.

Originally each of the three, then named the *Virginia, Pennsylvania* and *California,* had two smokestacks.

In the new design—and renamed the *Brazil,* the *Argentina* and the *Uruguay*—they have one stack. They had carried some 750 passengers each; the capacity was reduced to about 500 for the South American service by the reduction of the number of passenger rooms and by increasing rooms in size. A tiled outdoor swimming pool was added to each ship, which proved a tremendously valuable factor in the program of entertainment now enjoyed at sea, and air conditioning was extended to the dining rooms.

In shipping circles the prospects for the success of the proposed new operation were not considered bright. The trip was too long, it was said. But Moore-McCormack Lines, submitting the most favorable bids offered for the service, was assigned it and started the operation in October of 1938. Immediately it became obvious that the trade needed the ships.

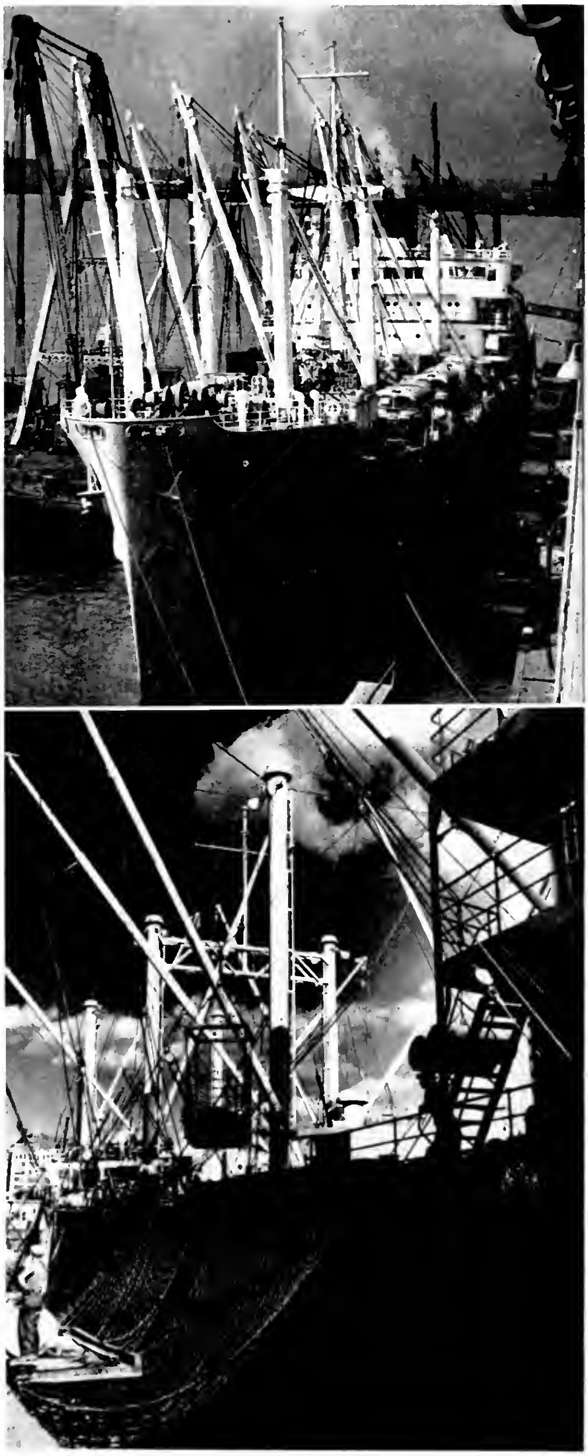
Prior to the operation, a weekly sailing had been maintained to South America's East Coast by the ships of two other operating companies and in the last year of their operation they carried some 7,500 passengers. In 1939, the first full year of the new American Republics Line operation, the three big ships carried 17,020 passengers. In 1940 this mark was boosted to 20,693. Another new record was in the making in 1941 when the war came.

Another major project, one which marked a new era in the expansion of the company, was a building program that involved completion of sixteen new combination cargo-passenger ships, starting with the launching of the *Donald McKay* in the spring of 1939. This program was the first tangible construction to emerge from the new building program visualized by the Maritime Commission for the American merchant marine. It was destined to prove even more important during the next few years, because it was the forerunner of the upbuilding of the nation's shipping and ship construction facilities which, with the coming of war, meant so much to the success of the Allied cause.

Actually, only twelve of the new ships were turned over to Moore-McCormack Lines; the other four, which were to have reached the company early in 1941, were taken by the government, which then was building up its forces for such emergency as might arise coincident to to the European war. Of the sixteen ships, four were C-3 passenger ships, named for four rivers associated with the Moore-McCormack operation—the *Rio Hudson, Rio Parana, Rio de la Plata* and *Rio de Janeiro.* These four became baby flat tops after the Navy took them over, and two of them were sunk in action.

Eight of the ships were of the C-2 group—the *Donald*

Top and bottom: The "Mormacisle," showing the elaborate cargo handling equipment on the present freighter fleet.



K. C. Tripp, West Coast Manager of Moore-McCormack Lines.

McKay, Mormachawk, Mormacwren, Mormacdove, Mormacgull, Mormaclark, Mormactern and *Mormacswan.* Four were of the C-3 group, the *Mormacpenn, Mormacyork, Mormacmail* and *Mormacland.* They, too, when Pearl Harbor came and the privately owned shipping facilities of the nation were taken over by the government, went to war and served nobly as transports of men and material.

Among the many efforts of Moore-McCormack Lines to encourage trade in the areas served by its ships, the creation of its Trade Development Bureau and development of refrigerated space in its cargo ships stand high. When the recent war finally drove Joseph A. Medernach, the Moore-McCormack representative, out of Czechoslovakia, he being the last United States citizen to leave that country, Mr. Medernach returned to New York to a new assignment, as director of trade development. The functions of his department include surveys of trade prospects, efforts to find markets for producers and to find materials for available markets and a dozen other activities that are intended to encourage a free movement of trade.

The refrigeration of ships is largely in the hands of G. R. Aitken, of the Moore-McCormack New York office, who has studied the problem extensively in the United States and abroad, from the standpoint of both supply and transportation. Today Moore-McCormack operates twenty-two ships that have refrigerated equipment. The fact that the seasons are in reverse between the United States and South America creates vast possibilities for this type of service, in that fresh fruits are needed in both continents in seasons when domestic sources have been exhausted.

Recently the vessel *Mormacisle* arrived in New York with the largest cargo of Argentine pears, plums and grapes ever to have come to the United States under conditions of new so-called "intransit sterilization". The

(Please turn to page 102)

The Moore-McCormack trade routes.

Operation and Maintenance Factors For Marine Turbines and Gears

By R. J. BROWN
Assistant Turbine Engineer
General Electric Co., San Francisco, California

EDITOR'S NOTE: In an able and detailed discussion of operational and maintenance factors for marine turbines and gears, R. J. Brown explains the effect of operational procedures, both direct and indirect, on the steam rate and on the mechanical performance. He develops and gives examples of record charts to aid in checking the maintenance history and provides a schedule of inspections and equipment checks which can not help but prove of value to the operating engineer and to the performance of his engine.

Copies of the entire paper are available but only the sections which are of day to day value are published here. The paper will be continued in the August issue.

The author, R. J. Brown, above, has been with the General Electric Co. since graduating from Johns Hopkins with a degree in Mechanical Engineering. His experience for the first five years was in turbine design work. Since coming to the West Coast in 1945, he has specialized in turbine application and operation particularly in the marine field.

GOOD operation of propulsion gears requires that consideration be made of not only power output but also the RPM which occurs. The criterion of power operation should be the gear torque factor of $\frac{\text{power}}{\text{RPM}}$ and continued operation above the maximum rating torque factor should not be done, bearing in mind too, that if operation at powers above rated is done an additional increment of loading on the low pressure side due to uneven load variation between the high pressure and low pressure turbine may also occur.

Maintenance In General

Good operation of the turbine and gear cannot entirely by itself assure non-outage and continued efficient performance as some wearing and corrosion of parts will take place with time. Also other parts of the power plant as boilers, condensers, pumps, valves, and the like upon which the turbine and gear are dependent for operation may suffer damage or faulty operation and thus affect the turbine and gear itself. For these reasons maintenance of the turbine and gear is necessary.

Maintenance can be of a planned or of a casualty type. A neglecting of the former may result in the latter and in doing so be much the more costly. For this reason, planned maintenance is pretty well recognized as a good economic practice.

Casualty Maintenance

Casualty breakdown usually requires no particular decision as to making or not making repair. If it prevents operation maintenance must be immediate; if it affects performance, maintenance must be at the earliest opportunity. The need for maintenance is usually noted by some unusual noise, vibration, or temperature rise in the unit, or the sticking of a moving part.

As noted above if a casualty has occurred to other parts of the power plant upon which the turbine and gear are dependent then at the same time consideration to the effect on the latter must be given. Thus, if a boiler should become salted and prime, quite possibly the turbine throttle and governing valves may become stuck in the stem packing and the nozzles and buckets may be coated with deposits. Certainly the sticking of the throttle or governing valve must be considered as a casualty to the turbine and require immediate repairs and the removal of the deposits from the turbine buckets and nozzles should be done at the first opportunity to return the unit to efficient performance.

Preventive or Planned Maintenance

Planned maintenance simply means the periodic inspection and checking of the apparatus and fixing up of any discrepancies found at the time. It should always be kept in mind that basically planned maintenance is for the benefit of operation in a future interval of time and not for what has already occurred in the past interim of

This paper was presented at May 31, 1949, Meeting, Northern California Section, Society of Naval Architects and Marine Engineers

time. However, in considering planned maintenance it is always good policy to review the Engine Room Log before determining the extent of the inspection to be made.

Iterim of inspection is, of course, difficult to predicate as operation is the dependent variable. However, assuming normal good operation having taken place and all casualty type maintenance having been taken care of the following general recommendations for planned maintenance are made, together with a recommended maximum interim for its performance. This program of planned maintenance is based on both design judgment and on practical experience of recommending and supervising maintenance of numerous units operated under varied conditions.

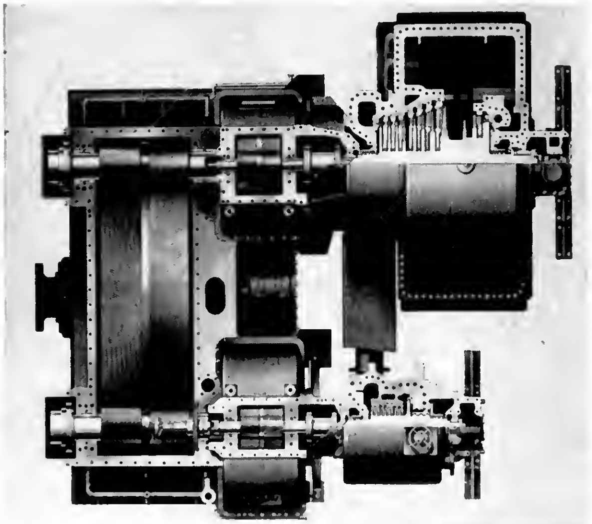
Program of Preventive or Planned Maintenance Inspection

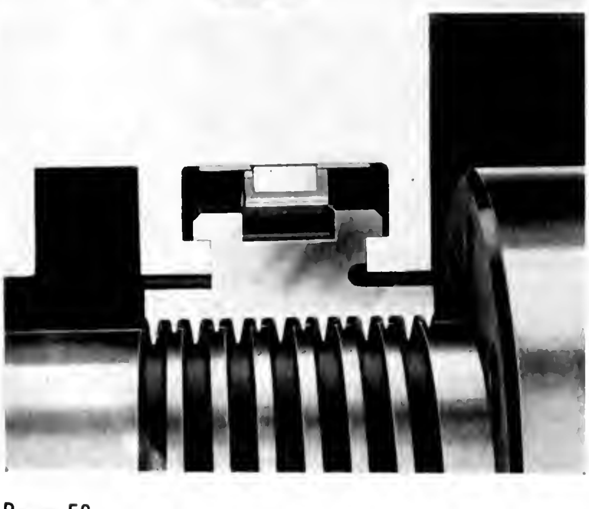
Main & Auxiliary Turbines

Each Four Years Maximum

(1) Open Turbine Casing

(a) Inspect for corrosion, erosion, and fouling of internal parts, soundness of parts, and wear of packings and packing fits. Clean all steam path parts, stationary and rotating, of compound and rust. Renew or repair parts as necessary.





(b) Check and record all important clearances and compare to design values and tolerances. For an impulse design turbine these are classified as follows:

(1) Wheel to nozzle and diaphragm clearances at bucket shroud band.

(2) Average inter-stage and end labyrinth packing radial clearances.

(3) Inter-stage and end labyrinth packing axial clearances if of high-low tooth design.

For (1) and (3) if clearances are outside tolerances and exist through all stages make adjustments to rotor location; if in any particular stage check diaphragm and then relocate diaphragm or packing as required.

For (2) if clearances are outside tolerances replace with new packing or remachine old packing to restore design clearance. If any one packing is worn appreciably more than the others then the central location of its diaphragm should be checked. (If packings are all worn on the bottom only it probably means that a bearing went down at some time; if worn all around or at opposite bores, then excessive vibration has probably occurred at some time due perhaps to improper starting.)

(2) Open Control Valve Chest Assembly

(a) Grind in or renew valves and seats as required using dummy discs with guides when grinding valve seats.

(b) On Generator sets check and set valve lifts so that proper paralleling will continue.

(c) Check valve stems for alignment and condition. Renew stem packings.

(3) Open Maneuvering Valve Assembly on Propulsion Sets and Throttle Trip Valve on Auxiliary Sets.

(a) Grind in valves and seats as required using dummy discs with guides when grinding valve seats.

(b) Check valve stems for alignment and condition. Renew stem packings.

(4) Open and Clean Up All Speed Governing Mechanisms.

(5) Open and Check Extraction Non-Return and Shutoff Valves and Operating Mechanism.

(a) Grind in valves and seats as required.

Each Two Years Maximum

(1) Open and Inspect Journal Bearings and Thrust Bearings.

(a) Measure bearing clearances and replace any bearings which have excessive clearance or wiped babbitt.

(b) Stone journals if scored slightly. If Journals

Top: General Electric cross-compound geared (speed-reducing) steam-turbine unit for ship propulsion. Drawing (top view) shows parts in semisection of typical "C-3" design.

Bottom: Close-up view of high- and low-tooth shaft packing of General Electric steam turbine.

are badly scored, machine journals undersize or build up with metal spray in a satisfactory manner and remachine to original size. (This latter may be recommended for units which are in duplicate in order to avoid the carrying of various size spare bearings.) If journals are remachined or built up and remachined it is advisable to check balance the rotor.

Each One Year Maximum

(1) Open Carbon Packing Boxes.

(a) Inspect packings, shaft lands, and packing box seal faces.

(b) Clean up shaft lands and boxes as required. If shaft lands show to be badly scored or pitted then it is advisable to build up with Monel or stainless steel in a satisfactory manner and remachine to standard size or in some instances assemble a packing sleeve or turn packing lands undersize. (This latter requires special bore packing.)

(c) Check packing clearances and condition of packing. Refit to design clearance or install new packing as required.
On modern marine turbines with high temperature superheated steam, carbon packing must always have radial clearances not less than that specified by the manufacturer.

(2) Open Low pressure Turbine Inspection Cover.

(a) Inspect last buckets and exhaust casing for signs of water erosion.

(b) Check that moisture removal orifices are open.

Main Reduction Gears

*Each Eight Years Maximum**

(1) Inspect Journals and Bearings of HP and LP Side High Speed Gears, HP and LP Side Low Speed Pinions, and Low Speed Gear.

(a) Measure bearing clearances and bearing crown thicknesses or bridge gauge dimensions.

(b) Replace any bearings which have excessive clearance or wiped babbitt. (In order to maintain 100% tooth contact the forward and after bearings of each individual gear and pinion rotor must have basically the same crown thickness.)

* The maximum interim here given is based on the assumption that on all previous examinations of the gear teeth the contact line showed no misalignment to have taken place, that inspections of the high speed pinion bearings indicate no failure of oil supply to have ever taken place and that the oil had been clean of grit and kept up to specifications.

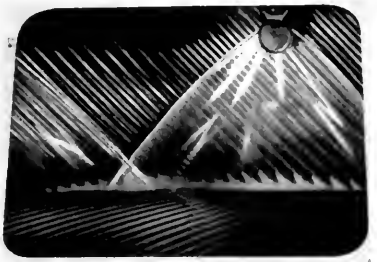
Each Four Years Maximum

(1) Inspect Low Speed Gear Thrust Bearing and Runner.

(a) Measure thrust bearing clearance and reset if required.

(b) Clean up bearing and runner as required.

(2) Check Alignment of High Speed Pinions to HP and LP Turbines.



Spoon-type nozzle spraying oil into mesh of marine propulsion gear.

(3) Clean Out Main Oil Sump.

Each Two Years Maximum.

(1) Inspect HP and LP Side High Speed Pinion Bearings and Journals.

(a) Measure bearing clearances and crown thicknesses or bridge gauge dimensions.

(b) Clean up bearings and Journals as required.

(c) Replace any bearings which have excessive clearance or wiped babbitt.

(d) If journals are scored follow procedure noted above for turbine journals.

Note: If pinion bearings generally show wear or scoring, consideration should be given to opening and examining other gear bearings.

(2) Inspect HP and LP Side High Speed Gear Thrust Bearings.

(a) Clean up bearing and runner as required.

(b) Measure thrust bearing clearance and reset as required.

Note: With thrust bearing removed a clearance check of HS gear bearing may be simply made by feeler gage.

(3) Inspect HP and LP Side Flexible Coupling Between High Speed Gears and Low Speed Pinions.

(a) Clean up coupling and teeth as required.

Each One Year Maximum

(1) Inspect Gear Teeth Of Each Element Through Holes For Notation Of Apparent Tooth Contact And Tooth Surface Condition.

(a) If any misalignment or wear of teeth shows determine and remedy cause.

(2) Inspect HP and LP Side High Speed Coupling Between High Speed Pinion And Turbine.

(a) Clean up coupling and teeth as required.

(3) Inspect Oil Spray To Meshes.

(a) Clean out all spray nozzle strainers. (If the oil system has become dirty at any time this check should be made more frequently.)

Auxiliary Set Reduction Gears

Each Four Years Maximum

(1) Open Gear Casing.

(a) Inspect all bearings and journals and clean up as required. Measure bearing clearances and crown thicknesses.

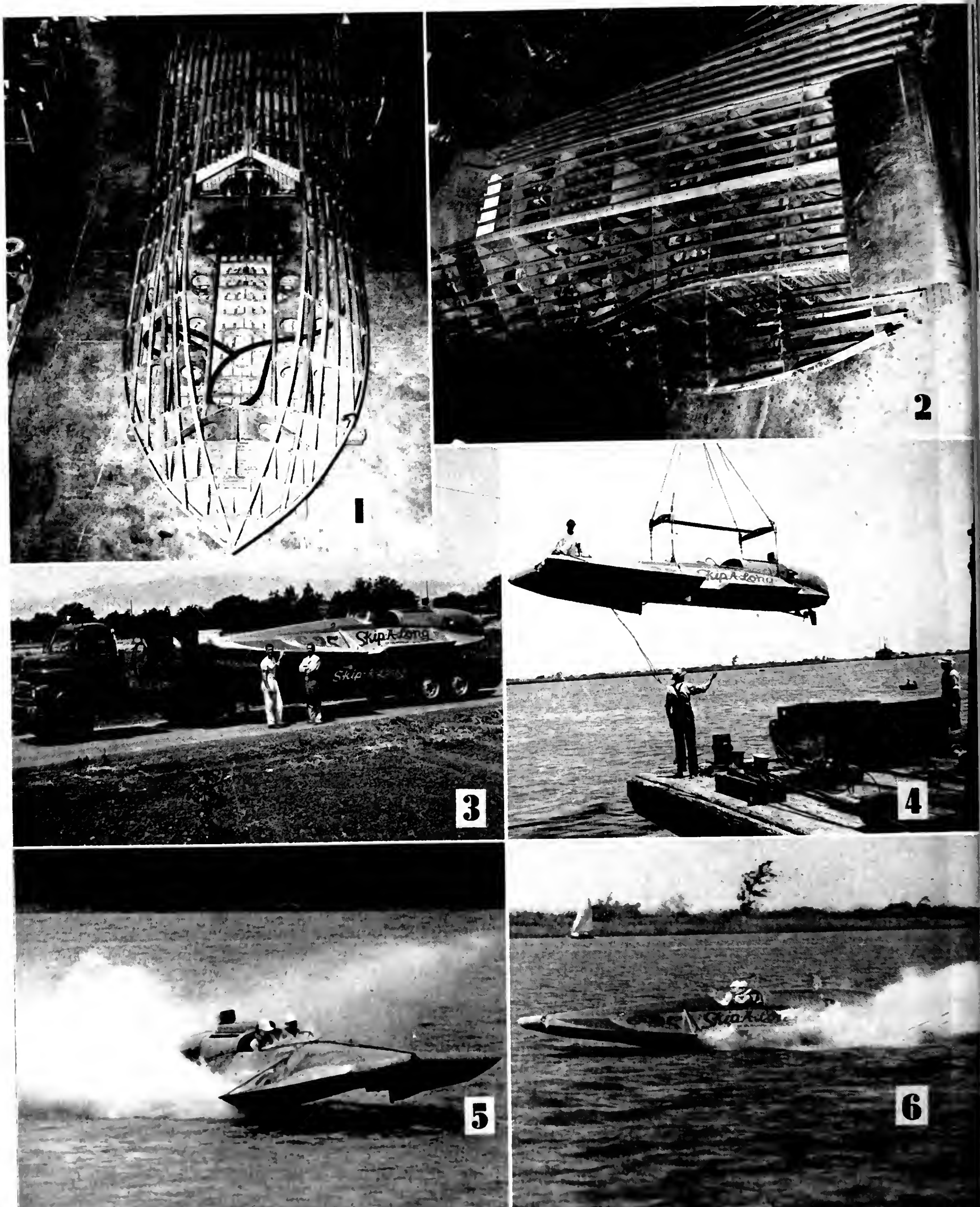
(b) Replace any bearings which have excessive clearance or wiped babbitt.

(c) If journals are scored follow procedure given for turbine journals.

(2) Inspect Thrust Bearings And Runners And Clean As Required.

(3) Check Alignment Of Set.

(Please turn to page 61)



Stanley Dollar's "Skip-A-Long-of-California" under construction (1 & 2); en route to Sacramento (3); being launched (4); and during trials (5 & 6). Stanley Dollar and Ollie Meek are shown in several of the pictures.

Stanley Dollar Jr. at Detroit Races

(Pictures on opposite page)

During the period from July 2 to Sept. 5, Stanley Dollar Jr. will race his *Skip-a-Long-of-California* in the Gold Cup, Detroit Memorial, Maple Leaf, Jones Memorial, Harmsworth Trophy, Detroit Marathon, and Silver Cup speed races. His past record in speed boat races has been notably successful. This time he built the boat, too.

Skip-a-Long-of-California is an all-aluminum streamlined hydroplane, 30 feet long with a 12 foot beam and powered with a 2,000 horsepower Allison aviation engine. The Alcoa aluminum bottom is 3/16″ thick and the deck ⅛″. Transverse braces and longitudinal bulkheads are ⅛″. Hull rivets are aluminum, as are the 4″ centered ribs. Only the struts, shaft and rudder are steel, except that the deck is screwed on with stainless steel screws. The Allison engine's 9,000 rpm are geared down to 3,000 and the boat made 115 mph on trials.

Dollar is 34 years of age, a graduate of Stanford, and grandson of Capt. Robert Dollar. He is vice president of the Robert Dollar Company and Globe Wireless Co., of which his father, R. Stanley Dollar, is president. He spent five years in the Army, enlisting as a private and emerging after the Philippine campaign as a major. He is Commodore of the Tahoe Yacht Club.

Dollar's friend and co-pilot, Oliver W. Meek, who assisted in the building of the boat in an old winery at Hookston, California, will be with him in the races.

Marine Turbines and Gears

(Continued from page 59)

Each One Year Maximum

(1) Drain Oil And Clean Out Sump.

(2) Inspect Gear Teeth Through Inspection Hole For Notation of Apparent Tooth Contact And Tooth Surface Condition.

(a) If any misalignment or wear of teeth shows determine and remedy the cause.

While the above maintenance schedule can hardly be complete in every detail it will serve as a guide for general planned maintenance.

As noted before the time interval of inspection for particular cases is entirely dependent upon operation and experience may well dictate intervals other than those given.

Maintenance Data Sheets

In order to aid in the performance of maintenance inspections it is suggested that regular sheets be used for recording the measurements that are made. By their use records are kept in an orderly manner and the possibility of neglecting to make certain checks is minimized.

As regards the latter, and especially for inspections involving the opening of casing, which is done only at relatively long intervals and at considerable expense, it should be recognized that a neglecting or a short-cutting of measurement checks cannot be considered good maintenance procedure.

Along with the measurements a record should be made of the condition of the unit as regards general cleanliness and wear. After reassembly a record should also be made of how the unit operates with respect to noise and vibration.

Some Common Maintenance Items

While a consideration of all the specific maintenance items of the marine turbine and gear that may arise is not possible here, a brief discussion of some few of possible occurrence will be made Vibration of turbines and its correction, cleaning of turbine steam parts, and bearing wear and replacement are problems which may at one time or another be encountered.

Vibration of Turbines

Excessive vibration at any time is detrimental to a turbine and should not be allowed to continue. Basically it results in the generation of repeated forces that are transmitted from rotor journals to bearings and bearing housings, thence to the turbine structure and foundation, and finally to the surroundings. The repeated forces result in repeated stress of parts and their failure due to fatigue of material is a distinct possibility. Failure of such turbine parts as bearings, governor linkages, and oil piping have resulted. Especially those parts (and parts remote from the turbine also) which happen to be in close resonance to the vibration frequently will be subjected to heavy repeated stress and they may fail most unexpectedly.

In addition as previously mentioned, under Operation, shaft vibrations may wipe out packings and cause excessive leakage clearances.

The causes of vibration in turbine rotors are several, such as, misalignment, warped shaft, rubbing, wiped journal or thrust bearing, worn couplings, bearing oil whip, and unbalance. While the last is most commonly blamed for vibration, consideration of the check for the others should always be made first. A complete discussion of causes of vibration of turbines is in itself a broad subject and cannot be carried on here; as regards unbalance, however, some comments may be of value.

Unbalance of a turbine rotor that has been in service is generally the result of a bent shaft, uneven wear of parts, uneven deposit of boiler compound, or the loss of some part of a bucket or band. Obviously, the particular cause of the unbalance should be determined and correction be made. Bent shafts should be straightened or be replaced if bending is appreciable, dirty rotors should be cleaned, and the buckets or bands that have been lost should be replaced. (Lost buckets, if the number is few, are sometimes compensated for by removal of an equal number of opposite buckets.) Following repairs, a check

balancing of the rotor should be made before placing it in service.

Generally speaking repairs to a turbine rotor of the latter type may be done either in place or on removal of the rotor from the ship to a shore-side shop. Generally small rotors can be lifted out of a ship and be repaired ashore most advantageously while large rotors may most advantageously be repaired in place.

Where rotors are removed from the ship, check balancing is performed in dynamic balancing machines. For high speed rotors made up of integral parts, as in the case of solid coupled turbine rotors and pinions for auxiliary generator sets, the trueness of the assembled rotor should always be checked and corrected if needed before balancing the complete rotor. In certain cases it will also be advisable to check balance each individual part and then check balance the assembly as each major part is added.

The check balance of a rotor left in place may be made either with a portable balancing unit set up in the casing or above the casing, or by balancing at speed when steam driven. In regard to the latter most turbine rotors have external balancing rings or internal balancing rings,

(Please turn to page 88)

Todd Buys Brown's Houston Yard

Todd Shipyards Corporation has completed its first three jobs on vessels needing drydocking and voyage repairs, at its newly-acquired plant at Houston, Texas.

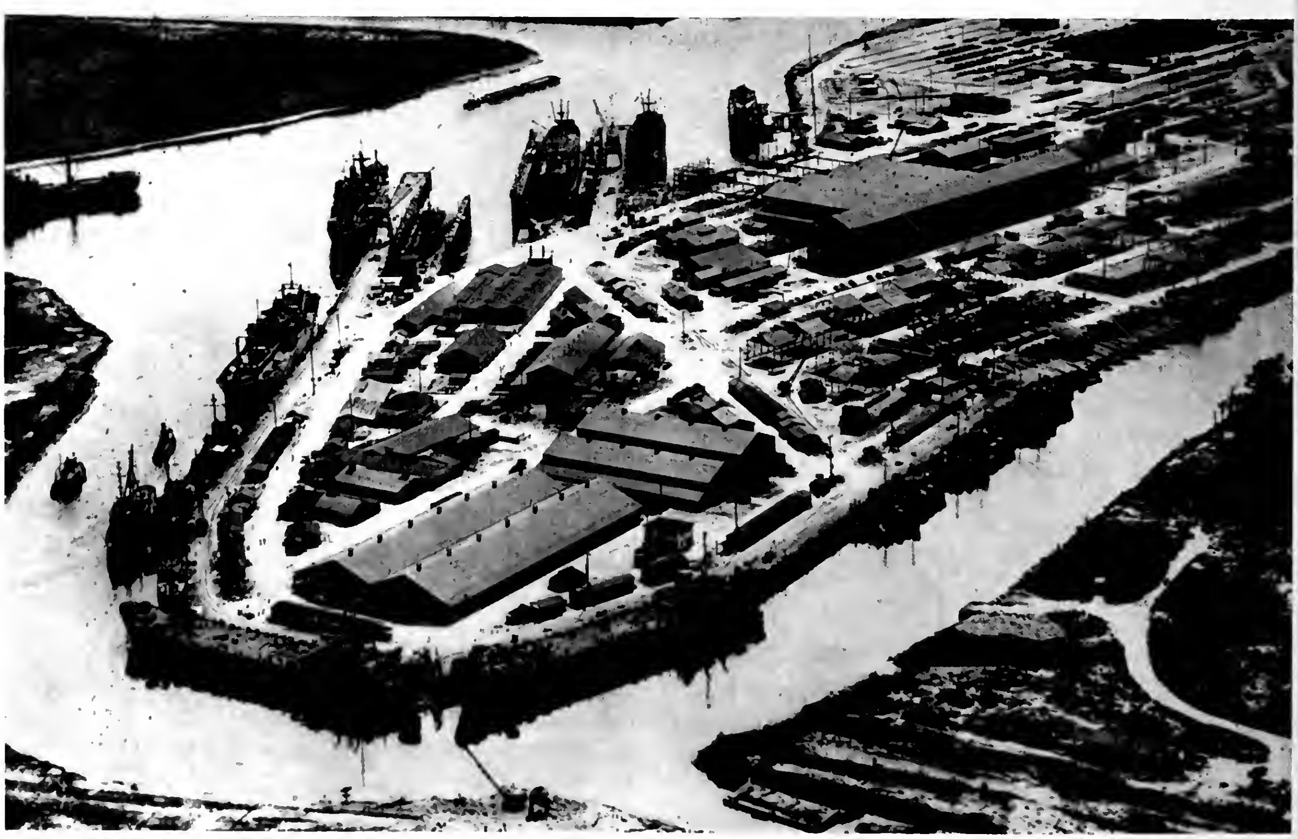
Todd purchased the yard from the Brown Engineering Co. in late April. Immediately upon closing the deal, Todd's engineers and workmen started dredging the slips and under the drydocks, and rearranged and installed working facilities. The plant expects to repair vessels of all types which use Houston's fast growing port, and to build all manner of small vessels. Bids for new construction have already been submitted.

Todd was approved by the Navy Department as purchaser of the property, the Navy reserving their interest and estate in the property as a standby plant for a period of 20 years. Todd has agreed to keep the plant in a state of readiness in case of a national emergency.

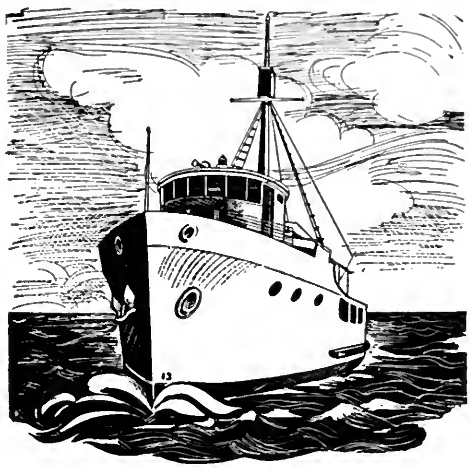
The deal called for leasing to Todd the major portion of Brown's plant, with about 3,000 feet fronting on the Houston Ship Channel and 6,000 feet on Green's Bayou.

The facilities include extensive pier and wharfage space, a full complement of utility and fabricating shops, and two drydocks. No. 1 drydock is 558′ long, 84′ wide, with a 24′3″ draft and lifting capacity of 10,500 long tons. No. 2 drydock is 351′ long, 63′3″ in breadth at the entrance, has a 20′ draft and lifting capacity of 3,000 tons. Both drydocks are served by 40-ton Gantry cranes with 35-foot radius.

Aerial view of the newly acquired Todd Houston Shipyards.



Coast Commercial Craft



New Diesel-Electric Tug Appears on the Rivers

First of its type on the rivers, a diesel-electric tugboat recently was put in operation at the Marine Ways of Carnegie-Illinois Steel Corporation's Clairton Works. Designated the CIS6, it is used as a harbor tug to shift coal barges which supply coal to the by-product coke plant—the world's largest—of this United States Steel Corporation subsidiary.

The tugboat operates 24 hours a day, with three 8-hour crews, each consisting of a pilot and an engineer. The crew is assisted by barge men at the landings.

Of all-welded steel construction, the craft has ⅜-inch thick hull plates fabricated from USS Cor-Ten to take advantage of the strength, resistance to atmospheric corrosion and weldability of this high-strength, low-alloy steel.

Hull of the boat is of special Carnegie-Illinois design, with a model bow and model stern. Over-all, the hull is 70 feet long, 18 feet wide and 9 feet deep. Draft of the vessel is 6 feet, 3 inches.

The Fairbanks-Morse 420 H.P., 2 cycle, 7 cylinder engine in the C156 Diesel-Electric Tug.

The diesel engine is a Fairbanks-Morse 420-horsepower, 2-cycle unit. It has 7 cylinders, each with 8½-inch bore and 11½-inch stroke. Its normal operating speed is 514 revolutions per minute.

The 250-volt marine-type General Electric generator driven by the diesel engine is rated at 290-kilowatt output. It supplies power to operate a 350-horsepower propulsion motor connected to the propeller by a 5-inch shaft. Rated speed of the motor is 300 to 400 revolutions per minute. The four-bladed, bronze propeller is 60 inches in diameter, and has a 46-inch pitch.

For steering, the CIS6 has a steering rudder and two flanking rudders. One hydraulic system operates the steering rudder, and a second separate hydraulic system operates the two flanking rudders. Both steering systems are automatically controlled from the pilot house. The pilot house was designed to permit clear vision in every direction; fully insulated, it and the cabin are heated by an automatic, oil-fired, hot-water system.

The CIS6 was towed up the Ohio River from St. Louis, where it was built by St. Louis Shipbuilding and Steel Company, to Paducah, Kentucky, and after a four-day layover for inspection, proceeded to Clairton, Penna., on the Monongahela River, under its own power. It docked at the Marine Ways early in February, and after final inspection, painting and fitting, began operating at routine tasks.

Operation of the new tugboat will be watched with interest because of the unique features of its design and construction. Its successful performance will lead, no doubt, to other boats being built for similar service.

On the Ways

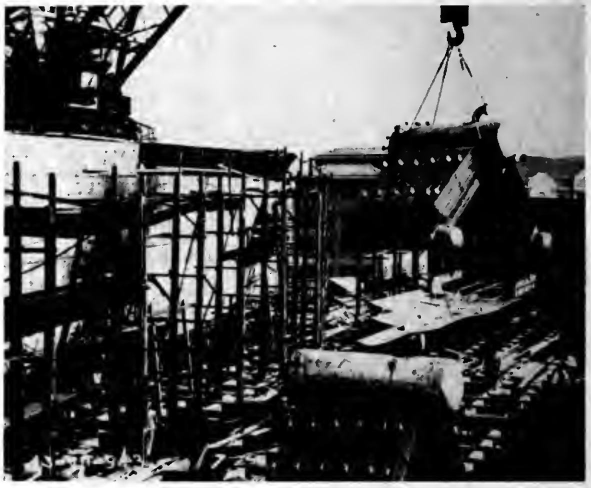
New Construction — Reconditioning — Repairs

Installation of Babcock and Wilcox Boilers On Six Navy Brazilian Destroyers

Installation of boilers and other equipment on six navy destroyers for the United States of Brazil is nearing completion at the Navy Yard in Rio de Janeiro. Sea trials are expected in the near future for the CT *Amazonas,* first of this group of ships being built by the Arsenal de Marinha da Ilha das Cobras.

Top: The C. T. "Amazonas," first to be completed of six Brazilian Navy destroyers. A Navy man would tell us that C. T. means Contra Torpediro.

Bottom: Launching of the C. T. "Amazonas" (at left) at Rio de Janeiro. Sister ship, C. T. "Araguaia," will be next.



Babcock & Wilcox boiler pressure parts being lifted to C. T. "Amazonas."

Sister ships of the CT *Amazonas* are the *Araguaia, Ajuricaba, Araguari, Acre* and *Apa.* "CT" stands for Contra Torpedeiro (destroyer).

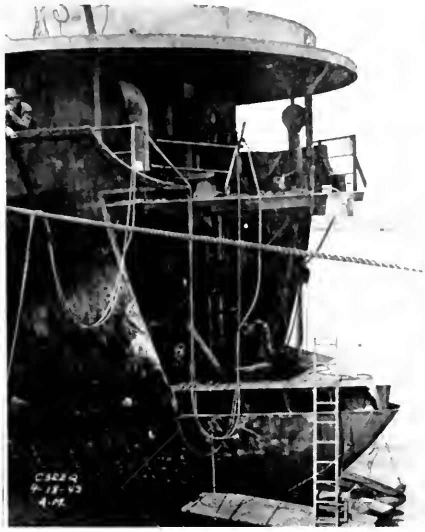
Each destroyer is 323 feet long with a 33-foot beam, draft of 8 feet 6 inches and displacement of 1,340 tons. With 34,000 shaft horsepower it will have a speed of 35.5 knots.

In each ship there will be three B&W boilers of the three-drum express type with double uptakes. Each boiler will be equipped with nine oil burners and convection type superheater. The boiler is designed to generate 111,000 lbs. of steam per hour at an operating pressure of 410 lbs. per square inch at a temperature of 710°F. Propulsion will be effected by means of geared turbines.

A complement of 150 officers and men will be carried by each destroyer. Armament will include four 4.7-inch guns, seven small guns, and eight 21-inch torpedo tubes quadrupled.

New Stern in Seven Days

View of stern damage on S.S. "Elmer A. Sperry."



Stern of vessel with damage cut away.

Completion of vessel.

Fabricated stern section of S.S. "Elmer A. Sperry" prior to installation.

In just seven calendar days, the San Pedro Yard, Bethlehem Steel Company, Shipbuilding Division, laid out, fabricated and installed a new stern on the S.S. *Elmer A. Sperry,* a liberty ship whose bulbous cruiser stern crumpled when the vessel collided with the wharf in Long Beach Harbor while attempting a turn.

Contract called for completion of the work in just seven calendar days in order to avoid delaying the vessel, which at that time was discharging at Long Beach. Offsets were secured from Bethlehem's Baltimore Yard and the stern of the vessel laid out in the San Pedro Yard's Mold Loft. Form templates were made and the entire stern pre-fabricated by the yard before being installed. The job was completed within the contract time, and the ship sailed on schedule—another example of the on time service performed by this yard to shipping operators.

Big 5-Blader

Largest propeller ever cast at Bethlehem Steel Company's San Francisco Yard was removed from mold in the Yard's foundry June 28. Weighing over 22 tons, this five-bladed propeller was cast on order for Doran Company, Oakland, and it will be installed in July at Bethlehem's San Francisco Yard on the S.S. *R. G. Follis,* a 100,000 barrel capacity tanker operated by the Standard Oil Company of California.

Pacific WORLD TRADE
Reg. U. S. Pat. Off.

Current World Trade Data

The following current information concerning trade with foreign countries is quoted from the Foreign Trade Bulletin of the American National Bank of Chicago through the courtesy of A. M. Strong, vice president. Complete details regarding any matter mentioned can be obtained from their Foreign Department. While the data has been compiled from sources which they consider reliable, it is disseminated without responsibility on their part.

Our export trade continues at a high level. April exports amounted to $1,147.6 million dollars, or 9 per cent over the 1948 monthly average. It is expected that 1949 exports will be as high or higher than in 1948. Our imports are declining. During April we imported 532 million dollars as against 632 million in March. Imports from European countries have decreased during the last two months. The sixteen European nations receiving our aid supplied us with approximately 24 per cent of all of our imports prior to the war. Now they supply only 13½ per cent of the total.

The decline in imports is due to three basic causes—high prices for foreign goods, a decline in U. S. business activity, and the trade barriers created by the multilateral trade agreements between the European nations. Our imports are also affected by the rumors about impending devaluation of European currencies. Many importers are deferring purchases in anticipation of lower prices.

The decline in our imports is again widening our foreign trade gap and will eventually affect our export business since other nations are earning less dollars with which to buy our goods. Our government and the governments of other countries are now intensifying their efforts to promote imports into the United States. These efforts deserve every assistance from our manufacturers, exporters and traders. Increased imports mean increased exports, increased sales and production.

Argentina

The Argentine Central Bank on May 25 issued circular No. 1106, modifying the previous exchange permit system. Two new lists "A" and "B" were established, containing most of the items in the former categories as well as some additional items.

As regards United States goods, the Central Bank will consider applications for foreign exchange covering goods in Category "A". Such importations must not exceed 25 per cent of the average imports during 1947 and 1948 of individual importers. For the time being, imports from the United States, will be authorized on basis of prior exchange permits, for which application must be made before June 30.

Category "B" goods can only be imported "without foreign exchange" being granted by the Central Bank. Applications for permits to import goods in Category "A" and "B" "without use of foreign exchange" from Central Bank, may be made without limitation at any time, provided funds were held abroad by importers prior to December 13, 1948 or in case the merchandise represents a capital investment. The Central Bank will also consider applications for prior exchange permits for list "A" goods from newly established industrial enterprises, although they cannot show any imports during the aforementioned basic period.

According to a recent statement of the Minister of Finance, commercial trade debt to the United States was $143 million in the middle of May in 1949. Because of the dollar shortage, Argentine authorities are restricting imports from the United States to 25 per cent of 1947-1948 average. The Central Bank of Argentina will use about 20 per cent of the proceeds of future exports to the United States for the liquidation of outstanding import indebtedness.

Brazil

Brazil's entire foreign trade for the year of 1948 resulted in a surplus of approximately 712 million Cruzeiros as against a deficit for 1947 of 1,610 million Cruzeiros. However, Brazil's trade with the United States resulted in an unfavorable balance of 1,489 million Cruzeiros (approximately $80 million). During 1948 Brazil was able to liquidate $50 million of the $90 million official dollar debts.

Brazil's favorable foreign trade balance with European countries amounted to 1,283 million Cruzeiros, which enables those countries to increase their exports to Brazil. United States exporters have curtailed their shipments because of delay in receiving dollar payments.

According to latest reports unpaid commercial items due to United States exporters amount to approximately $150,000.00. The recent exchange regulations have so

far not produced any tangible results.

The balances of the Banco do Brasil abroad was $285,432,000 at the end of March 1949; a reduction of $32,433,000 from the end of February. The gold held by the National Treasury declined during March $37,507,000.

An import license must be obtained from the Export and Import Department of the Banco do Brasil for all imports excepting cement, certain food products, pharmaceuticals and government purchases. Brazilian importers must deposit the dollar equivalent of cruzeiros for sight drafts drawn on them and apply to the Exchange Department of the Banco do Brasil for authorization to buy dollars. Such authorizations are not granted until 45 days after the application has been filed and the exchange is allocated in chronological order of the applications.

The drawees making a provisional deposit in cruzeiros furnish a written undertaking to assume the risk of exchange fluctuation.

Allocations for foreign exchange are made by the Banco do Brasil as follows:

Preferential category (exempt from the 45 days waiting period):

Agricultural machinery, fuels, lubricants, aluminum, lead, zinc and other scarce metals, and pharmaceutical products not manufactured in Brazil.

First Category:

Imports of absolute necessity covered by import licenses.

Second Category:

Transfers of capital, profits, interest, dividends, etc.

Third Category:

Transfers of transport and communication companies, travel, cultural, scientific and educational services, maintenance, etc.

Fourth Category:

Imports of relative necessity and "indirect or eventual convenience" covered by import licenses.

Canada

All capital and current account transactions involving non-residents are subject to regulations of the Foreign Exchange Control Board. The following current official rates of exchange have been in effect since July 5, 1946:

	Buying	*Selling*
United States Dollars	Par	½% Premium
Sterling	$4.02 per £	$4.04 per £

Merchandise imported from the United States may be paid for in United States Dollars. Imports may be prepaid up to a period of three months before date of importation and letters of credit must have an expiry date not later than three months from date of issue. Applications covering prepayment over a longer period or letters of credit with expiry dates beyond three months will be considered. A wide range of consumer goods are prohibited from entering Canada and some imports are subject to quotas based on prewar imports.

With minor exceptions, Canadian exporters are required to deliver to customs a Combined Export Entry and Application in connection with every export shipment. In addition, special export licenses must be obtained from the Department of Trade and Commerce, Ottawa, for commodities and goods under export control, and exports to the United States must be paid for in United States Dollars. Non-residents may operate Canadian Dollar accounts freely without a permit. Residents of U. S. Dollar area countries may not pay or transfer Canadian Dollars from their accounts to residents of the Sterling area or special arrangement countries without permission from the Foreign Exchange Control Board. Balances of non-resident Canadian Dollar accounts are not convertible into Foreign Exchange at the official rate.

Payment of transfers of Canadian Dollars from residents to non-residents require permits which are readily approved by authorized dealers covering payments for permitted entry, commissions, fees, freights, interest, pensions, etc.

Canada's Foreign Exchange Control Board has modified its regulations to facilitate the purchase, sale, and holding of Canadian securities by U. S. residents. On May 5, the Board announced that it was prepared to register for subsequent sale in Canada outright purchases in Canada by non-residents of publicly issued Canadian bonds and debentures. Since January 1946, this registration has been restricted to stocks or shares. The proceeds of the sale of securities registered with the Board may be withdrawn from Canada in Canadian dollars and converted into U. S. dollars through the unofficial market.

China

Under new provisional regulations issued in Shanghai on June 3, the Bank of China was appointed to supervise foreign exchange transactions. Twenty banks have been appointed to act as agents for the Bank of China including the branches of National City Bank of New York, the Chase Bank and the Bank of America. Under the new foreign trade regulations all imports are subject to licenses. Foreign exchange can be purchased only by importers holding permits issued by the Trade Control Bureau or by others having valid permits.

The Bank of China with the approval of the People's Bank, issues daily foreign exchange quotations. Outside market dealings are prohibited. Foreign exchange derived from exports and other sources must be surrendered to the Bank of China against a "Bill of Foreign Exchange Deposit," valid for forty days; within this period the holder may trade these "Bills of Foreign Deposit" on the official market, at the official rate. On expiration the Bank of China may purchase same at the official rate of the day. These "Bills of Foreign Exchange Deposit" may only be purchased for the purpose of paying for imports duly licensed by the Bureau for Control of Foreign Trade; for the advance payment of freight of export goods; commissions and insurance premiums under permit and for other purposes duly approved by the North China People's Government.

Colombia

The port of Buenaventura, Colombia, was badly congested with a cargo block of almost 39,000 tons in mid-April. Efforts were being made to divert cargo to the Atlantic ports of Barranquilla or Cartagena.

Costa Rica

The Import Control Office recently published further changes in the import categories for exchange control

purposes, mostly in regard to pharmaceutical products.

Cuba

The Cuban Government is considering tentative plans for a World Fair at Habana, opening in the latter part of 1951 and continuing through 1952, to commemorate the fiftieth anniversary of the Cuban Republic.

Ecuador

The Department of Commerce in Washington reports that import licenses will be refused to importers who greatly delay meeting their foreign obligations, that is, if they do not pay their drafts within the maximum period of sixty days from date of arrival of goods in Ecuador.

Egypt

Under the terms of the Anglo Egyptian Financial Agreement transferable sterling will not be made available for payment of goods from the United States. Shippers that have been trading with Egypt via Holland or other countries of the transferable sterling area will no longer be able to ship on this basis.

England

The British Board of Trade announced an eight point program to increase exports from England to the U. S. and Canada. It is proposed to raise the level of exports to the U. S. and Canada by about 32 per cent by 1950.

France

Under new arrangements between the Economic Cooperation Administration and the French Government, freight charges for ECA shipments may now be paid in francs on arrival of the goods in a French port, when the copy of a P.R.E. license and a bill of lading expressed both in dollars and francs are presented.

Indonesia

Importations are subject to an exchange permit which is at the same time an import license, valid generally for six months. Exchange permits for imports from hard currency countries (U. S. for example) are usually given to old established importers on the basis of their prewar imports from those countries. A share is, however, reserved for Indonesian newcomers.

Japan

Japan's exports and imports in 1948 totaled $259 million and $683 million, respectively, according to a recent announcement by the Board of Trade. The adverse balance of $424 million was covered by the United States through its appropriations for aid and relief in occupied areas. Imports in 1948 were 62 per cent, and exports 28 per cent, of the 1937 value, and a substantially smaller proportion of prewar volume.

Pacific WORLD TRADE

Mexico

The Mexican Government announced a rate of 8.65 pesos to the U. S. dollar. This rate has the approval of the World Monetary Fund and the United States Treasury. Until July 1948 the rate of the peso was fixed at 4.85 to the dollar.

The Banco de Mexico resumed on June 18 foreign exchange transactions at the following rates:

Selling—8.65 pesos per dollar.
Buying—8.64 pesos per dollar.

The Mexican Government has removed on April 14, 1949, many commodities from export control. These commodities include Garbanzo, tobacco, raw cotton, linseed, certain metals, salts, colors, cork, steam engines, certain machinery, certain electrical apparatus and vehicles. Complete information as to the products affected may be secured from Chicago and Milwaukee offices of the Department of Commerce.

Peru

All outstanding import licenses in Peru granted prior to December 3, 1948, are now annulled by a Supreme Resolution. All goods not cleared prior to May 16, and which are included in the prohibited category under current foreign trade regulations, will be confiscated.

The Peruvian authorities have added a number of commodities to the list of goods that can be imported into Peru without the necessity of an import license and with free exchange. The new items include yeasts, palm and cocoanut oil, waxed paper, cones, tubes and spools for the textile fibres excluding rayon, aluminum and alloys, leads, compressors for industrial refrigeration, spare parts for washers and catalogues, etc.

Philippine Islands

Imports into the Philippines must be marked to show the country of origin in accordance with the Revised Administrative Code issued March 21, 1949. The Code also contains recent interpretations and instructions repealing previous decisions.

The country of origin, as well as the gross and net weights of the contents must be plainly indicated on the immediate containers and outer cases, preferably by stencil. If the articles contained therein are required to be so marked, the exact nature of the goods need not be described on the outer cases. A 3-page circular describing the recent changes in the Philippine mark-of-origin requirements will be supplied gratis on request to the offices of the Department of Commerce.

Under Executive Order No. 193, Philippine Importers must register with the Import Control Office in order to obtain registration certificates which will entitle them to apply for quota allocations and import licenses. The number of the import license must be transmitted to the American exporter in order to secure the respective consular visa. If shipments cannot be effected before the expiry date of the license, request for extension may be made ten days prior expiration with the Import Control Board.

Marine Insurance—

The Challenge of Export Packaging and Damage Prevention*

By CAPT. JOHN M. VAN ORDEN, Administrator
Damage Prevention Division, Matson Navigation Co.

EARLY in 1947 a Claim Prevention Committee was organized to study the problem of damage prevention. It soon became apparent that it was necessary to engage some person to carry out the desires of the Committee and to devote full-time effort to the endeavor. For two years I worked in this capacity until the activity became so expanded that it was necessary to establish the program as a separate Division of the Company.

Similar committees were established in Los Angeles Harbor, the Pacific Northwest and in each of the ports in Hawaii. Close contact is kept between the Committees and the exchange of information has contributed much toward resolving difficulties that had contributed to damaged cargo. We have made exhaustive studies of claims and their causes. New equipment, new methods of stowage, new methods of handling goods on the docks and in the ships have all come from the concentrated efforts of all concerned.

Early in the history of the Program I made a trip to Hawaii to get the effort under way in those ports. To get to the root of the problem I called upon many of our consignees. The record of remarks concerning our service makes interesting reading—reading that was not too comforting to us. Among other things it made us realize how closely connected were Claim Prevention and public relations. It brought home to us in a most convincing manner that the consignee bears the expense of everything—the price of the goods, the cost of the packing, and the inland and ocean freight charges. This consignee is just as much a customer of ours as he is the customer of the shipper. And above all, the consignee *does not want to file a claim.* The consignee wants his goods. And he wants them in a condition fit for resale or for use. He has invested his funds in goods for the sole purpose of realizing a profit. A claim, even if paid promptly and in full, does not satisfy him. A claim represents a failure of service and the frustration of a venture. This is now the guiding policy of our Program and has its effect upon our approach to the packaging problem.

When our claim experience or complaints from the consignee indicate that a certain product is consistently outturning in a condition other than perfect a thorough investigation is made. It is watched closely when received at the loading pier, the packing is examined and if the goods came by rail car the method of carloading is inspected. When the goods are stacked on the dock, that operation is observed to see if the damage could be occurring there. The stowage in the vessel is studied, the ships' officers are made aware of the problem and the carriage of the goods at sea is investigated. The port of discharge is contacted so that they might be apprized of the problem and an outturn report is submitted by them.

It is amazing to see what these studies reveal. Perhaps the method of stowage is found at fault and correction made. Handling on docks is watched. If the carloading is contributing to the damage, photographs are taken and

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* An address before the Oakland World Trade Club's July meeting.

Admiralty Decisions

By HAROLD S. DOBBS of San Francisco Bar

Longshoremen's and Harbor Workers' Compensation Act

DURING the last few years, I have referred many times to the Federal Compensation Act entitled "Longshoremen's and Harbor Workers' Compensation Act." In general, it might be said that those persons who are not seamen and who are injured or meet their death aboard a vessel on navigable waters of the United States, come under the Act.

The exception to the rule of injury or death upon navigable waters applies to seamen who are under the Act referred to as "members of the crew." If the injured person or the one who meets his death was employed aboard a commissioned vessel on navigable waters of the United States at the time of the injury or death, the Act would apply and compensation or death benefits would follow to the injured employee or representatives of the deceased employee. A "member of the crew," one engaged in navigation or maritime employment and not merely by way of incidental employment aboard a vessel, would be excluded, and would be required to look for his compensation for injury or death to the ordinary rules of negligence. He or his representatives would then be required to prove that by a negligent act or omission the vessel's owners were responsible for the injury or death. In those cases, the negligent act or omission to act of a fellow employee would also be evidence upon which judgment could follow in favor of an injured member of the crew. Judgments which result from such suits are no different in effect or form than a judgment that you or I might receive as the result of injury or damage following an automobile accident.

Most of us are familiar with the general provisions of the state compensation acts, and particularly the California Compensation Act, which is administered by the Industrial Accident Commission of California. It might be said that the Longshoremen's and Harbor Workers' Compensation Act parallels to a great extent the provisions of the State Act with the exception of the sums that are payable for injury and death. When the Act was first argued before the Congress of the United States in 1927, its authors stated the theory and purpose to be to provide compensation for a class of employees who worked on vessels in navigable waters, who, although they might be classed as "seamen," were regarded as distinct from "members of the crew," being employees whose service was that of laborers of the sort performed by longshoremen and harbor workers as distinguished from those employees on the vessel who were naturally and primarily on board to aid in her navigation.

Probably the most confusing thing about the Act is that, for example, a man might be working in a shipyard as a welder, and suffer injury or death while so employed in the shipyard proper; and on the other hand, that same man might be required to go aboard ship to weld a line on a vessel already in service, and one considered to be on the navigable waters of the United States, and by that simple act of walking aboard, lose his status temporarily under the State Compensation Act and come within the jurisdiction of the Longshoremen's and Harbor Workers' Act. Cases in the past have held that one going aboard a vessel remains within the State Compensation Act until he actually reaches the gunwale of the ship or its side; while on leaving the same vessel, is considered to be within the jurisdiction of the Longshoremen's and Harbor Workers' Act until he leaves the gangway which has its terminus on land. More recent cases, however, have held that injury or death on the ship's gangway is within the Longshoremen's and Harbor Workers' Act because the gangway is a part of the ship's equipment and so attached. If, on the other hand, this same welder were injured while working on a new ship under construction, before it had been commissioned, it is correct to conclude that he would remain under the jurisdiction of the California Compensation Act even though he might be injured or meet his death aboard the vessel. The test, of course, is that the vessel is not truly within navigable waters.

The Act has, almost since its inception, been liberally construed in favor of the injured employee or his family. As evidence of the liberality of the Act, one need only prove that he was engaged in the course and scope of his employment at the time of injury, and the employer, on the other hand, may defend from the standpoint of liability only by showing that the injured or deceased employee was caused to suffer injury or death because of his willful negligence or intoxication. It seems correct also to say that the employer under the Act becomes somewhat of an insurer of the safety of each and all of his employees. Even where a ship is in dry dock, the Act continues to apply, provided it is not a new ship under construction or one that had not been commissioned prior to the accident or death.

It might be interesting to review some of the leading cases which have determined the question of the "maritime character of the transaction".

In a case where a motor boat sales company employee, hired primarily as a janitor, was drowned in a navigable river when the boat capsized, the employee's death was held to be compensable under the Act, as maritime employment on navigable waters of the United States.

A longshoreman who, while at work unloading a vessel lying in navigable waters, was struck by a swinging

hoist and precipitated upon the waters, was permitted to recover under the Act on the ground that the injury was governed by maritime law.

One claimant's injury occurred on a concrete mixing plant which was a temporary building, non-maritime in in nature, erected on land. The court held the injury was not compensable under the Act, either on the theory that it would cover one who was doing work in connection with a contribution to the erection of a dry dock, or that the Act should apply because the work was being done on land in an adjacent area reasonably close to a dry dock, notwithstanding the fact that the mixing plant at the time of the claimant's injury was connected by steel pipes with a barge that was engaged in laying a concrete floor of a dry dock under water.

Another interesting case concerned the rights of the administratrix of a deceased employee who was killed while giving signals to the operator of a crane which was stationed on the dock and which was used in loading scrap iron from the dock on a navigable river into the hold of a large vessel. The cable of the crane broke, causing the pulley to fall and strike the employee as he stood on the deck of the vessel. The court held that the Longshoremen's Act would apply and the death was compensable notwithstanding that the force causing the injury originated on the dock where the crane was stationed, or that the injuring force was exercised against the employee as though he were on land, or that the employee's contract of employment included no work of a maritime nature.

A carpenter who was killed while engaged in construction of a dry dock on a navigable river was held to be "engaged in maritime employment", notwithstanding the fact that the dry dock was not finished and that prior to the time of the accident water had been pumped out of the river to the side of the dock to permit completion of the structure.

In a recent compensation case, the court was confronted with the problem of determining whether the deceased workman was a seaman or a longshoreman. Evidence disclosed that the vessel on which the deceased was working was used solely for fueling other vessels. The deceased's duties had no connection with the navigation of the vessel except the incidental task of throwing the ship's line; and his primary duty being to free coal if it stuck in the hopper while being discharged into a fueled vessel. The court held that the deceased was not a seaman, and having been injured upon navigable waters of the United States, he thereby became entitled to compensation under the Act.

A diver was employed to help in building the foundation for the pier of a bridge, and was injured while standing inside the cofferdam on a floating raft due to the premature explosion of a dynamite charge which he had placed to remove a boulder outside the cofferdam. He was held not entitled to recover since the waters within the cofferdam were withdrawn from "navigable waters" to which the statute applied. In my opinion, the court reached an improper result by a very technical analysis of the facts.

A railroad company's employee died as the result of striking his head against the side of a vessel after being pulled from the fender of the dock when the vessel's cable with which he was walking along the fender while the vessel moved into dock, tightened. The court held that the cause of action and injury were completed on navigable water, and the weight or tightening of the cable was the inception of the cause of injury. The rule is acceptable on the basis of a cause of action originating on land for personal injury, but completed on navigable waters.

The Act specifically provides that it shall be applicable only where a remedy may not validly be provided by state law. Recently, however, the United States Supreme Court has held that this provision cannot be read in a manner which would exclude recovery under the Act in a case not covered by the provisions of the State compensation law, and has indicated the desirability of extending the Federal act to every maritime injury for which no remedy has been provided by State compensation law.

The Act exempts all Federal and State employees from its application.

The Act is compulsory as to those employees and employers who are within its scope. It not only creates a liability for the payment of compensation benefits by employers to injured employees, but also requires the payment of such benefits through legal self-insuring or through insuring with an authorized insurance carrier. Similarly to the State compensation acts, it makes contractors liable to compensate the employees of their subcontractors if the latter are uninsured. Again, and parallel with the State compensation acts, the remedy provided by the Longshoremen's and Harbor Worker's Act is exclusive where the employer has secured the payment of compensation as required thereunder, and such employer has no liability under other forms of legal action. On the other hand, where an employer subject to the Act has failed to comply with its compulsory insurance provisions, an employee injured in his service may elect to collect compensation or to maintain an action at law or in admiralty for damages, and the employer in defending against such an action may not avail himself of the common law defenses such as contributory negligence, assumption of risk, act of a fellow servant, etc. There is a good reason for depriving the employer of the aforesaid defenses, and that is simply that if he were insured properly he would not be entitled to those defenses under the Compensation Act. Therefore, his own negligence enlarges his liability and restricts him to the same defenses otherwise in order.

Under the recent amendments to the Act, 66⅔% of the average weekly wage is used for determining the compensation payable. However, the weekly compensation cannot exceed $35 per week for total disability, and not less than $12 per week. The awards for loss of various members of the body and use and function of parts of the body have been raised considerably, and the death benefit increased to $10,000.

Probably the most important change in the benefits can be found in the amendment of credits under the Act. Previously, all payments, whether paid on account of temporary disability or partial disability, were added

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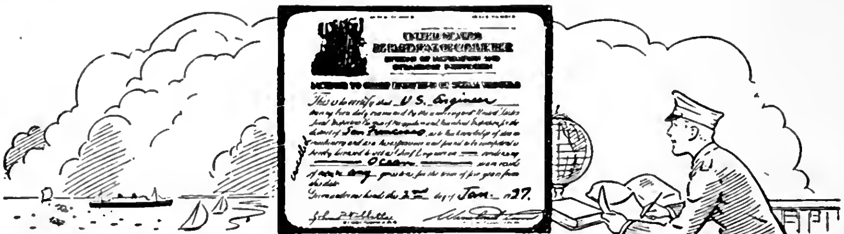


Your Problems Answered

by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

"Chalk Talks" on Applied Mathematics

Logarithms Explained

THE freighter S.S. *Marine Reviewer* had cleared San Francisco yesterday for several South American ports. Chief Engineer Frank Farran was glad to get away from the docks and to sea where he belonged. Still a young man he had at last achieved his lifelong ambition to be in full charge and responsibility of the million dollar power plant of a great ship. Formerly Staff Chief of the U.S.A.T. *General R. M. Square* he had brought with him Frank McCoy as First Assistant and George Cambell as Third. There was so much to be done on this ship that Farran knew it would be many trips before the day workers would catch up with the cleaning and painting. The *Marine Reviewer* had just finished her first four-year inspection and many things had gone wrong during this first 24 hours.

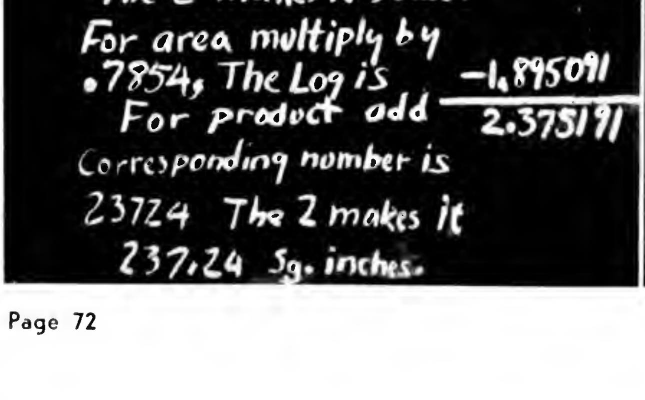
He rang for the steward to order his afternoon coffee. Glancing up he saw George Cambell hesitating outside the always-open door to his office with a book and papers under his arm.

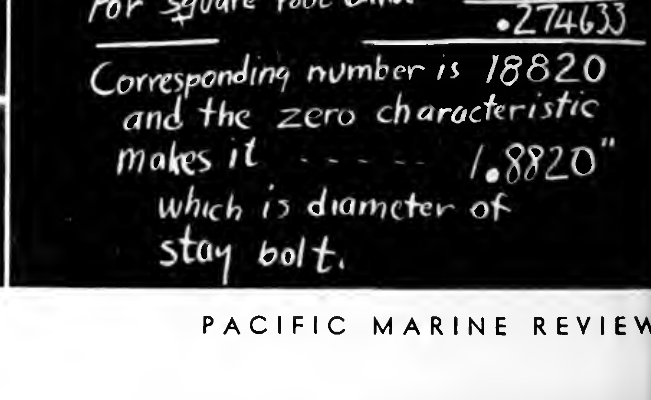
"Come in, George. Don't stand out there and block the passage."

"Mr. Farran, sir, please read this awful letter I have from the correspondence school about my last three problem sets that I sent in. I'm discouraged and think I'll quit this self-improvement program. It is terrible hard." George's face affirmed his misery.

Few except his most intimate friends knew of Frank Farran's degree in Mechanical Engineering from a great

Figures 1 and 2 mentioned in the text.





western university, but all knew that his hobby was mathematics. He read the letter and grinned.

"You forgot the Characteristic again, George." Farran was kindly but serious. "Remember, the log tables do not print the characteristic of the logarithm, only the Mantissa. If you multiplied two numbers together long hand—you can multiply long hand, can't you?—regardless of the location of the decimal point in either of the two numbers, the answer would be the same except for the location of the decimal point. It's the same in logarithms. The characteristic is determined only by the location of the decimal point. If the number 3 is followed by a whole bunch of ciphers we do not know the value of the number until somebody locates the decimal point. The logarithm is the exponent of 10 which gives this number. If it's 3 and two ciphers, or 300, the exponent of 10 is more than 2 (10^2 is 100) and is less than 3, (10^3 is 1000) but the mantissa from the tables is 477121 and this is correct whether the number is 3, or 300, or 30,000. By putting the characteristic in front of the number we know where the decimal point is to be. For 3 the log is 0.477121, for 300 the log is 2.477121 and for 30,000 the log is 4.477121 and so on." Frank hesitated, then continued while scratching on paper. George by this time had seated himself.

"Now look, George," he continued. "The log of 100 is 2 because 10 must have an exponent of 2 to equal 100. The log of 100,000 is 5 because 10 with 5 as an exponent or 10^5 is 100,000. But numbers like 25,400 would be more than 10^4 or 10,000 and less than 10^5 or 100,000. The log table indicates the mantissa of the logarithm as .404834, and you select the characteristic from knowing the location of the decimal place as 4. Thus the complete log of 25,400 is 4.404834 or $10^{4.404834}$ is 25,400."

If the number were 254 instead, it would be more than 10^2 and less than 10^3 and the characteristic of the logarithm would be 2. Being more than 2 it is 2 followed by a decimal point and the same mantissa as before. Thus, the log of

254.00	is	2.404834	and of
25.40	is	1.404834	and of
2.54	is	0.404834	and of
.254	is	—1.404834	

"The characteristic difference between logarithms of several numbers differing only in the location of the decimal point is the number at the left of the decimal point in the logarithm. Not given in the tables, it must be selected from our knowledge of the location of the decimal point of the number.

"The characteristic of logarithms of numbers from 1 but less than 10 is 0. From 10 but less than 100 is 1. From 100 but less than 1000 is 2. From 1000 but less than 10,000 is 3, and so on."

"The rule to remember is that the characteristic of a logarithm is a whole number, one less than the number of digits at the left of the decimal point in the number. Now look," Frank continued, "the characteristic of 85 is 1. Of 978 is 2. of 6274 is 3, and of 8 is 0, and of .45 is —1 and of .045 is —2 and of .0045 is —3. And so on. For any number *greater* than 1 the characteristic is ONE LESS than the number of *digits before* the decimal point. For any number *less* than 1 the characteristic is negative and is ONE MORE than the number of *ciphers after* the decimal point."

"And finally, George, do you remember our discussion a while back about what to do with logarithms? It's all based on the exponent, and is in fact an exponent of ten. Add two logarithms to get the product of multiplication of the corresponding numbers. Subtract one logarithm from another to get the quotient of dividing the corresponding numbers. Multiply a logarithm by 2 or 3 to get the square or cube of the corresponding number, and divide the logarithm by 2 or 3 to get the square root or the cube root of the corresponding number."

Frank Farran looked up from this earnest discussion and found that others had slipped into the office and were looking on. "Mac" McCoy, now First Assistant, had not lost any of his "show me" attitude following his promotion. "I suppose now young George can go below and use logarithms on the main engines and come up with the reasons we salt the condensers when we use the evaporators. They don't ask nothing about them things in the Coast Guard examinations, even for Chief."

"Look Mac, you bloomin' Irisher," Farran's eyes twinkled. "If all engineers were as dumb as you, we'd still be sailing with scotch boilers and up and down engines at 8 knots with salt water in the boilers and not minding it. Except for the McCoys, men have minds which need stretching and exercise. A good man knows a lot more than the job he is on at the moment." A gale of laughter following this jibe at the friendly but stubborn First Assistant.

"But, Mr. Farran, after we subtract or add logarithms we have another logarithm for an answer." George was not amused at the joke but seriously puzzled.

"Oh, sure we do, but we convert the answer logarithm to the answer number in the log table again just as we got the original logarithm, only backwards."

"Well, could you work out some problems for us so we can see what you mean?"

"Oh, of course. It's really quite simple." Farran took some fresh paper and began to figure rapidly. "All right, here's an overboard discharge line that is 17.380 inches in diameter, find the area. (Fig. 1). The log of this diameter is 240050 from the tables. The 17 is more than 10 and less than 100 so the characteristic is 1. This makes the complete log 1.240050. To square it we multiply by 2. Then we get the log for .7854 which is 895091. From the rule for characteristic we find the —1 is correct. This makes the complete log —1.895091. To multiply we add these two logs and come up with this number. Note how the —1 adds in by subtracting. The log of the answer is 2.375191. We enter the log table in the log columns with the 375191 without the 2. We find the number 23724 but no decimal. But the 2 tells us that the number has 3 digits at the left of the decimal so we write the answer as 237.24 which is the square inches of the pipe."

"Gosh, Mr. Farran, do I have to work that out longhand to prove you right or wrong?"

"You sure do, George."

"Can we work out a stay bolt problem that way? I

(Please turn to page 104)

Ed S. Ramey

- -With The

Ed S. Ramey of Luckenbach S. S. Co.

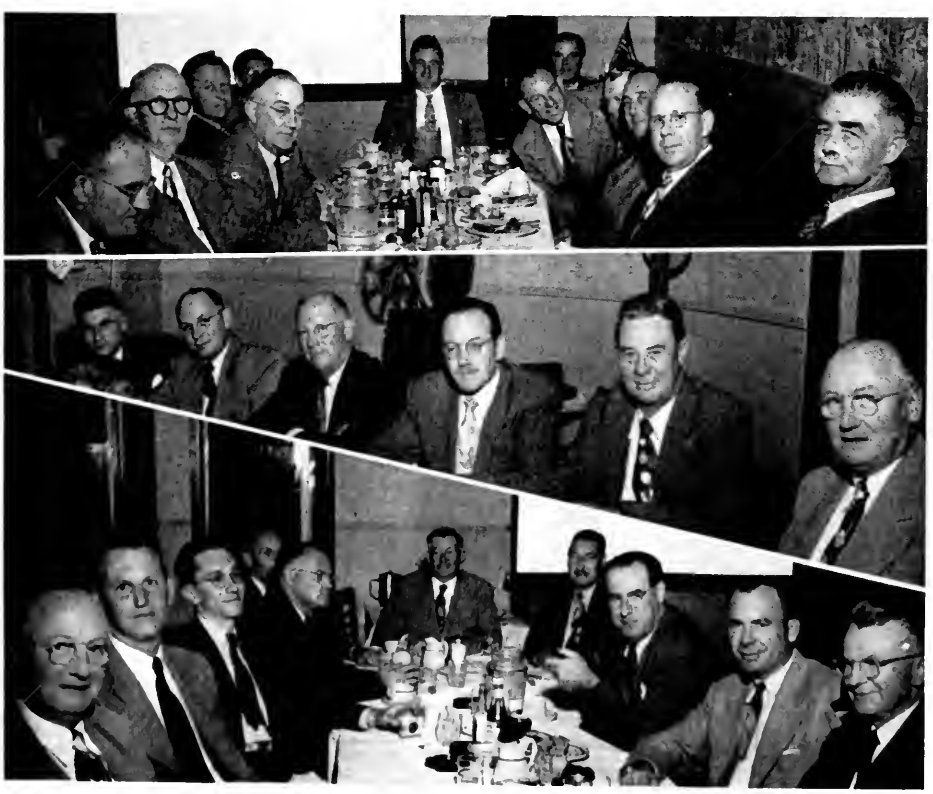
A dean of the West Coast marine engineering fraternity is E. S. (Ed) Ramey, Superintending Engineer for Luckenbach Steamship Company. Holding forth at Pier 46, Seattle, he is now in his 32nd year with Luckenbach.

Ed got his start in Florida, where he first went to sea at the age of 15, running on the tugs and barges to Cuba. After a three-year hitch in the U.S. Cavalry (1901-04) he joined the P. and O. (Peninsula and Oriental) out of Tampa, and Boston to Halifax. About this time construction started on the Florida East Coast Railroad that runs down to Key West, and Ed shipped as an engineer on the stern-wheelers that helped with the job. Then came six years with the U. S. Engineers on their dredges, and then back to the Florida railroad again, as Chief Engineer, for 3½ years on the car ferries to Havana.

In 1918, Ed joined the colors again — this time the Navy, and served as Lt. Commander on the ship that was to get him into his present situation, the *Harry Luckenbach*. When the owners got her back from the Navy, they didn't automatically get Ed, but he came along very shortly after, and began running her for Luckenbach. After two years on the *Harry* and six on the *Andrea*, he came ashore in San Francisco to take up duties as Port Engineer. This was in June, 1927, so Ed Ramey is one of the longest in service—as well as one of the best liked—on this coast.

In 1933, Luckenbach's engineering department was moved to Seattle, under Superintending Engineer Walter L. Green. Ramey stepped into that job in 1938 when Mr. Green went east to join the ABS (where he is now vice president). In 1942, Ed left Seattle to take on the big wartime job of Superintending Engineer for Luckenbach in Brooklyn, and came back home to Seattle in 1947. Recent jobs to keep him active have been the seven Luckenbach west coast conversions —3 in Seattle, 2 in Portland and 2 in Oakland.

Ed has a son (with Matson Line) and 3 grandchildren. His hobby currently is boating, a sport which he has apparently tackled with his usual vigor, for he has won the Puget Sound Star Boat Championship two years in a row. He now skippers his own power cruiser.



LOS ANGELES PORT ENGINEERS

The top picture includes: S. Deckart, American Bureau of Shipping; Harry Summers, American Bureau of Shipping (ret.); Hamp Neergaard, Burns S.S. Co.; Alex Robinson, Long Beach Marine Repair; George McCoy, Marsol Corp.; Harry Miller, Forster Shipbuilding Co.; Edwin Pike, American Bureau of Shipping; Lloyd Kennedy, U. S. Coast Guard; Roy Campbell, Federal Paint; Paul Gaudin, American Pacific S.S. Co.; Glen Gulvin, American Pacific S.S. Co.

Center group (Speaker's table), left to right: W. K. Patterson, Crane Co.; C. E. Whalen (speaker), Crane Co.; Dan Dobler, Texas Co. (president of Society); Burt Hale, Marsol Corp. (secretary of Society); Joe Here, U.S.M.C.; Fred Cordes, Deconhil Shipping Co.

Lower picture, clockwise around the table: Fred Cordes, Deconhil Shipping Co.; Mike Kelly, Richfield Oil Co.; Paul Shipley, Westinghouse; George Curran, American Pacific S.S. Co.; R. B. Berton, General Electric; P. F. Flaig, General Electric; John Black, American Bureau; Dayle Lyke, General Electric; Lloyd Richardson, Deconhil Shipping Co.

Port Engineers - -

Lloyd L. Richardson of Hillcone S.S. Co.

First experience in the marine field for Lloyd L. Richardson was as a marine engineer during World War I, on tankers. He has also sailed on freighters, steam schooners and passenger vessels. Between wars he sailed for a number of years on tankers, principally for Richfield Oil Corporation and the Union Oil Company of California during which time he was Chief Engineer on a number of their vessels.

In December 1942 he entered the employ of the Deconhil Shipping Company and Hillcone Steamship Company, and in the early part of 1943 was appointed to his present position as Port Engineer.

Lloyd L. Richardson

Crane Movie at Puget Sound Meeting of Port Engineers

At the May meeting of the Puget Sound Society of Port Engineers, R. B. Kiffin of the Crane Company spoke and presented a movie on marine valves. His talk, which could be titled "Piping Pointers" or "Lifelines of Industry" or "Manufacture and Data on High Pressure Valves" or "How to Pick the Right Valve", was followed by an instructive question and answer session.

- - - And at Los Angeles-Long Beach

The Los Angeles-Long Beach Society was similarly addressed by C. E. Whalen at their June meeting. Pictures of both groups were taken by *Pacific Marine Review* and are shown on opposite pages.

PUGET SOUND PORT ENGINEERS

Top: E. W. Eggerstedt, U.S.A.T.; Roy E. Knowles, Carmac Shipyard; J. D. Wilson, American Bureau of Shipping; R. C. Storrs, American Mail; M. A. Johnstone, Olympic S.S.; E. W. Larviere, U.S.M.C.; Felton Young, Marine Surveyor, J. L. McNulty, Alaska S.S.; A. L. Sol-Bakke, Puget Sound Freight Lines.

Inset: R. B. Kiffen, Crane Co.; M. W. Felton, President, Alaska S.S. Co.; H. W. Pennington, Crane Co.

Bottom: J. W. Elkins, Board of Marine Underwriters, San Francisco; J. D. Gilmore, Alexander Gow; Jim Robertson, Lloyds Register of Shipping; E. L. Marquet, Board of Marine Underwriters, San Francisco; R. C. Black, General Electric; C. E. McDaniel, Fairbanks-Morse (with collection plate); Sid Smith, American Bureau of Shipping; H. M. Perry, General Electric; Jack Robb, U.S.A.T.; K. W. McDonald, U.S.A.T. (One name not furnished.)

San Francisco Port Engineers See Movie on Fulton Sylphon Metal Bellows

Al DeVoto
Harbor Supply Co.
Distributors for Fulton Sylphon.

Featured at the June dinner meeting of the Society of Port Engineers at San Francisco was a program jointly presented by Harbor Supply Company, headed by Al de Voto, distributors for Fulton Sylphon Division of Robertshaw Fulton Controls Company, and the Norman Brown Company, Fulton Sylphon's factory representatives at San Francisco. Norman Brown, assisted by Thomas E. Brewer, sales engineer, presented a movie showing the manufacturing and application of Sylphon metal bellows and temperature controls including the application to maritime requirements.

The audience was "taken for a visit" through the Fulton Sylphon factory at Knoxville, Tennessee, and via the movie they were able to view the intricate machinery required for the manufacture of the bellows and bellows assemblies. An explanation was given of the function and operation of temperature controls utilizing the metal bellows as an operating unit, both as applied to marine and industrial applications.

A question-and-answer period followed the picture showing, and a lively discussion ensued.

Left to right: Thomas E. Brewer, Sales Engineer, Norman Brown Co.; Ira B. Chapman, Chairman of Board of Governors, Society of Port Engineers, San Francisco; Norman Brown, head of Norman Brown Co., manufacturers' representative.

Vacation For San Francisco Port Engineers

Program Chairman Garlinger, of the San Francisco Society of Port Engineers, announces that there will be no meetings of the Society during July and August and that the next regular meeting will be held September 7.

E. F. Drew Sales Tour

The picture at the left was snapped during the Pacific Coast trip of Carl E. Sciple, sales manager of E. F. Drew's Power Chemical Division. Left to right: John J. Lewis, marine service engineer, E. F. Drew & Co., Inc.; J. F. Churchill, West Coast manager; Carl E. Sciple.

News Flashes

LINER MAY BE CONVERTED AT SAN FRANCISCO BAY YARD

THE P2 liner, GENERAL M C MEIGS, now in Suisun lay-up, may undergo a $1,600,000 "safety" conversion in a San Francisco Bay yard for American President Lines.

* * * * *

BIG CARRIER CONVERSION

The proposal by Secretary Johnson for conversion of two big carriers at a cost of $80,000,000, would possibly bring one of them to a Pacific Coast Navy Yard.

* * * * *

BETHLEHEM BUILDING BIG EXPORT LINERS

July 12 will see the start of American Export's CONSTITUTION at Bethlehem's Quincy yard. A sister ship, the INDEPENDENCE, was laid down March 29. Together they will cost $46,830,000. The ships will be 683 feet long, of 20,000 gross tonnage, with 55,000 horsepower in twin geared Bethlehem turbines.

* * * * *

NEW DELTA LINER TO BE DIESEL

The previously announced subsidy approved by the Maritime Commission of a passenger-cargo liner for Mississippi Shipping Co. (Delta Line) contemplates a motor ship, the largest in the U. S. Bids will be opened August 22. The type number will be P2-ME1-EA1 (or EB1 depending on the defense features).

* * * * *

WESTINGHOUSE TURBINES FOR SUPERLINER

Turbines and connecting gears for the four propellers of the new U. S. Lines' superliner UNITED STATES have been ordered from Westinghouse by Newport News Shipbuilding & Drydock Co. Shaft horsepower, 158,000; deadweight 12,810; gross tonnage, 50,000; official speed, 28.5 knots; passenger capacity, 2,000; crew, 1,000. Troop capacity would be 14,000. Refrigerated space, 48,300 cubic feet.

* * * * *

DISTRIBUTION OF SHIP BUILDING

The proposal to amend the Merchant Marine Act so as to distribute merchant shipbuilding to the three coasts (see May Pacific Marine Review) brought objection from Admiral Wheelock of the Navy's Bureau of Ships. He wanted the "older" yards on the Atlantic to build all the ships. (The oldest continuously operated yard in the U. S., Admiral, is Bethlehem, San Francisco, celebrating its 100th anniversary this year.)

Now Admiral Wheelock revises his proposal and suggests a distribution of the work after employment exceeds 60,000.

THE NAVY VESSELS LOANED TO RUSSIA

The return of the cruiser MILWAUKEE which had been loaded to Russia for use during the war brings up the question as to what other U. S. Navy vessels are still in Russian hands. Of the 581 Navy vessels loaned to the Soviet Union only the MILWAUKEE has been returned. The terms of the loan called for the return of all ships at the termination of the war. Some of the larger types still in Russian hands are 28 frigates (PF); 34 mine sweepers (AM); 30 landing craft, infantry (LCIL); 17 landing craft, tank (LCT); 3 ice breakers (CR); and 78 110-foot submarine chasers. It is reported that efforts are underway to bring about the return of all these naval units.

* * * * *

MERCHANT VESSELS LOANED TO RUSSIA

Charles D. Marshall, general manager of the Maritime Commission, is reported to have advised Congress to write off 86 vessels, including tankers, tugs and freighters, turned over to Russia under lend lease. Originally the number was 125, of which 34 were returned and seven lost. (Two more went to Russia under our settlement with Italy.)

* * * * *

PROTOTYPE SHIP IDEA MAY BE POPULAR

Among the operators who have seen plans of the "prototype" vessels, at least several have indicated an active interest. Large fleet replacements will be underway within a few years.

Yards bidding on the first prototype include: New York Shipbuilding Corp., Camden, N. J.; Newport News Shipbuilding and Dry Dock Co., Newport News, Va.; Bethlehem-Quincy Yard, Quincy, Mass.; Bethlehem-San Francisco Yard, San Francisco; Bethlehem-Sparrows Point Yard, Sparrows Point, Md.; Sun Shipbuilding & Dry Dock Co., Chester, Pa.; Bath Iron Works Corp., Bath, Maine; Consolidated Western Steel Corp., San Francisco; Ingalls Shipbuilding Corp., Birmingham, Ala.; Gulf Shipbuilding Corp., Mobile, Ala.; Alabama Dry Dock & Shipbuilding Co., Mobile, Ala.; Moore Dry Dock Co., Oakland, Cal.; Todd Shipyards Corp. (Los Angeles Div.), San Pedro, Cal.; Todd Shipyards Corp. (Seattle Div.), Seattle; Avondale Marine Ways, Inc.; Westwego, La.; Waterman Repair Division, Mobile, Ala.

* * * * *

SUBSIDIES FOR SHIP OPERATION ARE SMALL IN U. S.

Ship subsidy payments by various governments, as compiled by National Federation of American Shipping, include, <u>for each million dollars of national income</u>:

$150. by Norway (1947)
26. by Spain (1949)
1.90 by Britain
.06 6/10 by U. S. (and much of this is being repaid)

* * * * *

BETHLEHEM BUYS PIER

Bethlehem Steel Co. has purchased for cash Pier 14, Hoboken (foot of 14th St.). This structure, which had previously been under lease to Bethlehem, is a covered, single-deck pier 920 feet long and 102 feet wide.

* * * * *

CAPT. GEORGE FRIED DIES

Capt. George Fried, 71, master of some of America's biggest ocean liners, died July 5. Captain of the old LEVIATHAN, AMERICA, GEORGE WASHINGTON, and PRESIDENT ROOSEVELT, Fried was a central figure in many thrilling sea rescues.

Running Lights

Major General Philip B. Fleming —Chairman of the Maritime Commission

Major General Philip Bracken Fleming, United States Army, took his oath of office as Chairman of the United States Maritime Commission on June 6. He was appointed by the President for a six-year term which expires April 15, 1955, and was confirmed by the Senate on May 27.

General Fleming was born at Burlington, Iowa, on October 15, 1887. He attended the University of Wisconsin from 1905 to 1907 and then transferred by appointment to the United States Military Academy at West Point, from which he was graduated at the head of his class on June 13, 1911, entering the Corps of Engineers. During 1912 and 1913 he attended the Army Engineering School.

General Fleming served as a Colonel during the first World War, later reverting to his permanent rank of Captain. He was promoted to Major in 1920, to Lieutenant Colonel in 1935, to Colonel in January, 1940, to Brigadier General in February, 1941, and to Major General in November, 1942. He was retired as a Major General on January 31, 1947.

During his service with the Corps of Engineers, General Fleming was stationed at various times in all parts of the country, from Eastport, Maine, to Vancouver Barracks, Washington, and from St. Paul, Minnesota, to New Orleans, Louisiana; in the Philippines and the Canal Zone.

General Fleming was detailed as Executive Officer and Deputy Administrator of the Public Works Administration from 1933 to 1935, was in charge of the Passamoquoddy Project in 1935-36, and was Coordinator of the Resettlement Administration in 1936-37. In 1937 he was appointed District Engineer at St. Paul, Minnesota, and served there for two years in charge of improvements on the Upper Mississippi River.

In 1939 he served as Administrator of the Wage

Major General Philip B. Fleming, USA (right), takes his oath of office as Chairman of the U. S. Maritime Commission, administered by A. J. Williams, Secretary of the Commission, June 6, 1949.

and Hour Division of the Department of Labor, Administrator of the Federal Works Agency, the Public Roads Administration and the Bureau of Community Facilities.

On December 12, 1946, General Fleming was appointed to serve, in addition to his other duties, as Administrator of the Office of Temporary Controls, which was set up to liquidate the Office of War Mobilization and Reconversion, the Civilian Production Administration, the Office of Economic Stabilization and the Office of Price Administration. The Office of Temporary Controls was abolished June 1, 1947.

In 1944 and 1945 he toured Europe, North Africa and Russia at the request of the President to study construction problems, and in 1946 he made a 5,000 mile tour of India to study and recommend methods of highway improvement to the Indian Government.

General Fleming was awarded the Distinguished Service Medal by President Truman, May 7, 1946, for "outstanding service to the Government." "Under his energetic direction, a tremendous construction program including a wide variety of buildings and facilities for the Army and Navy, was accomplished in the United States, Puerto Rico, the Virgin Islands, Alaska and Central America," in the words of the citation.

He was designated a member of the Permanent International Commission of the Permanent International Association of Navigation Congresses, with headquarters in Brussels, by Secretary of State Marshall, and is chairman of the American Section.

Fleming Supports Shipbuilding Program

In his first public address as chairman of the Maritime Commission, Philip B. Fleming declared that one of the principal tasks of the Maritime Commission is "to awaken America to the realization that we are a maritime nation."

"Our objective," he said, "is to keep shipbuilding going at a level which will give adequate employment and enable the industry to expand quickly in time of emergency."

Ed Macfarlan Retires

Edwin J. Macfarlan, sometimes known as Joe, widely known in San Francisco shipping and foreign trade circles, retired July 1 from service as assistant to the manager of Standard Oil Company of California's Foreign Trade Department, after 48 years with the company.

For many years Macfarlan has been active in the affairs of the Marine Exchange, the Mariners Club, Export Managers Club, World Trade Association, Propeller Club, Pan American Society, Olympic Club and San Francisco Chamber of Commerce.

One of Eddie's proudest civic accomplishments was the founding, along with Dick Turner, of the Junior World Trade Association, of which both are the only lifetime Honorary Members.

Don't go 'way, Eddie. We'll be meeting you around town as usual.

Edwin Joseph Macfarlan

Brawner Appointed to Harbor Board

W. P. Fuller Brawner, Vice-President and Treasurer in charge of production at W. P. Fuller & Co., has been appointed to membership on the State Board of Harbor Commissioners by Governor Warren.

At 44, he has experienced nearly a quarter-century of business and community service since graduation from Princeton in 1924. He was president of the Junior Chamber of Commerce at the age of 31, and was a co-worker with those who founded the Junior Chamber in 1923. He has served on many committees of the Community Chest and was General Chairman for the Chest in 1936. During the Golden Gate International Exposition, Brawner acted as Chairman of the Special Events Committee and member of the Executive Committee.

Brawner served as a Colonel in the U. S. Army in World War II and held the position of Chief of Production in the Chemical Warfare Division. In 1947, he served as first Vice President of the Chamber of Commerce and in 1948 as President. As such, he made shipping, world trade and harbor development his major interest.

Fuller Brawner is a descendant of Western pioneers. His grandfather, W. P. Fuller, came West as a young man in 1849, panned gold and founded the business which bears his name.

W. P. Fuller Brawner

Mariners Frolic

NAMES FOR THESE GROUPS ARE ON PAGE 83.

Pictures taken for Pacific Marine Review by Tommy Thompson.

Panoramic view of Mariners Club Frolic in San Francisco's Palace Hotel Ballroom, highlight of Maritime Day.

Opposite Page

TOP: Fletcher Monson, junior past president; Capt. Al Berry, president of Mariners; Dick Glissman, Impresario, Master of Ceremonies.

SECOND ROW. Left: Capt. R. H. Andersen, Kerr S.S. Co.; Rolf Monson, Todd Shipyards.

Center: Carl Klitgaard, Jr., Todd's; J. W. M. Schorer, Holland-America; D. DeVries, Holland-America.

Right: Henry Gelhaus, Todd Shipyards; Marshall Garlinger, U.S.A.T.; John McArthur, Worthington.

THIRD ROW. Left: C. R. Redlick, Marine Terminals; Capt. Ray Demarest, Sudden & Christenson.

Center: Facing camera are L. M. Mauk, Pacific Far East Line; Capt. Kenneth Graham; John Wright, General Engineering & Dry Dock.

Right: Comdr. R. A. Mallek, S. F. Naval Shipyard; Ted Jerstad, Anchor Equipment Co.

FOURTH ROW.

Left: Al Engle of Triple A and friends.

Center: Harold Eames, Madrigal Line.

Right: At this table are Merrill Gigy, W. McMaster, John Stokes and Charles Compton.

BOTTOM.

D. N. Lillevand, Grace Line; Joe Dolan, President Emeritus; Alex Johnston, Pacific Marine Refrigeration Co.; Al Pittman, Hagan Corp.

Doc Eyman Visits Pacific Coast

Doc (E. E.) Eyman, Manager of Marine Sales for National Malleable & Steel Castings Co., Cleveland, recently visited Pacific Coast ports. At the Naval Architects' Spring Meeting at San Francisco, Doc was everywhere in evidence and Naco chain was well represented.

Doc (E. E.) Eyman, left), and A. J. Kashubeck, West Coast Sales Manager for the Railway Division of National Malleable & Steel Castings Co.

Miss World Trade; David J. Coddaire; Propeller Club President Eddie Harms; World Trade Week Chairman M. J. McCarthy.

Lloyd Fleming, Al Gatov, Maritime Day Chairman David Norman Lillevand, Commissioner Coddaire.

Another Maritime Day Starter

The keel for the American President Lines' third new $12,000,000 luxury liner, the S. S. *President Hayes,* was laid at 3 p. m. May 20, at New York Shipbuilding Corporation, Camden, New Jersey. The time and date coincided with the observation of National Maritime Day in San Francisco, the home port of the new ship.

The keel laying of the *Hayes* is being used as a symbol in the drive to rally American support for full-scale restoration of America's war-depleted passenger liner fleet.

Four passenger keels, excluding the *Hayes,* have been laid since the war, and all four of these within the past two months. Two of these were the *President Jackson* and *President Adams,* sisterships of the *President Hayes,* and the other two were for American Export Lines. It has been estimated that three times this number will be needed to restore the U. S. Merchant Marine to its prewar level—an important factor in national defense.

Opposite.

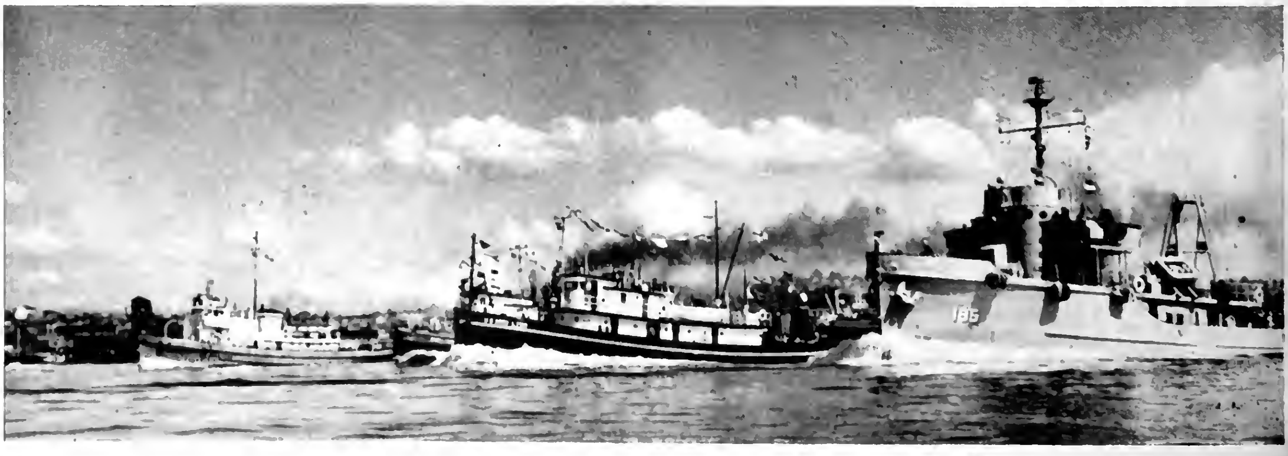
Top: San Francisco Supervisor Don Fazackerley and Major General James Lester, commandant of San Francisco Port of Embarkation.

Bottom: David J. Coddaire, Maritime Commissioner who was San Francisco's Maritime Day speaker, being greeted by Edward Macauley who was Commissioner during the war.

Seattle's Boat Race

Most spectacular feature of Pacific Coast's celebration of Maritime Day were the boat races held on Puget Sound. Attracting 13 entrants and hundreds of spectators in yachts and along Seattle's waterfront, the race was sponsored jointly by Seattle's Propeller Club and the Puget Sound Historical Society. The races were divided into seagoing and harbor classifications, with the Navy winning the former and the Army the latter, in each case the winner being closely pressed by a smaller entry of private enterprise, from the Foss fleet. Because the races possessed a real maritime flavor, all who participated hoped for their re-establishment as an annual event.

The picture shows entries neck-and-neck at the quartermark in Puget Sound's seagoing tugboat race. Winner was Navy's "Tatnuck," on the inside (right), followed by the "Wedele Foss" (second from left). In third place was the Army's Alaska Sector entry, the "Private Chevez." Seattle's USAT LT518 (center) ran into trouble, and finished fourth.



By Joseph C. Brewster
Chief Engineer

The rythmic beat of the human heart is comparable to the steady pulse of a well balanced Diesel.

If one is to maintain this perfect function which is a delight to a fine engineer, proper care of the fuel injection system is a necessity. Most Diesel trouble starts with poor injection.

For perfect functioning fuel must enter all cylinders in exact and equal amounts, it must enter at the proper time and be properly atomized for instantaneous combustion. A variation of this function in any one cylinder will give an unbalanced engine.

Of all the precision parts in a Diesel engine the most precise is in the injectors and fuel pumps. The proper care of these parts can not be over emphasized. They *MUST* be overhauled in clean surroundings and with proper tools and equipment for service and testing.

You would not trust the care of your heart to a quack doctor, but would seek a competent physician, so a good engineer seeks a specialist for the care of his injection equipment.

Los Angeles World Trade Week Pictures

1. Matson table. Left to right: Paul N. Carter, M.V. Boreen, Charles E. Brown, J. L. O'Brien, R. S. Gray, Lillian M. Dirocco; C. S. Booth, D. W. Ford.
2. Clockwise around the table: R. C. Heinz; E. E. Heck; James E. Bell, Pacific Far East Line; D. L. Simmons; Harry Regan; John Witherspoon; L. W. Young; K. R. Sadler; Carl Martin, Pacific Far East Line; William H. Wing, Reliance Commercial Enterprises.
3. Speaker Louis B. Pate, vice president of the Robin Line and president of the Propeller Club of the U. S.
4. Clockwise around the table: Capt. L. L. Lishman, Charles L. West, Ralph Chandler, John C. McHose, Walter F. Wilkinson, Francis Mieding, Arthur W. Nordstrom, E. G. Stubbs, C. F. Schwarberg.
5. Clockwise around the table: G. S. Mason, Thomas C. Cook, Dave Gunert, David E. Day, Roy E. Davis, B. D. Blanchard, all of Richfield Oil Co.
6. Left to right: James Loudon; Edgar M. Wilson, vice president, American President Lines, Ltd.; R. G. Bennet; L. A. Menning, General Freight Agent, American President Lines; Dr. Frederick Waller, Consul General, Republic of Austria; S. J. Hindle, General Agent, American President Lines.
7. F. J. Kelley, J. R. MacLean, R. M. Telfer, Jr., Leon C. Munson, W. Samuelson, H. W. Dennison.
8. The Moore-McCormack table. Second from left is Watson B. Smith, District Passenger Agent. Third from right is Ray Abbott, Traffic Manager. Far right is A. P. Smith, Manager.
9. Sydney D. Smith placing lei on Marta Toren, "Miss World Trade." The carnation lei was flown in from Hawaii for the occasion.

Maritime Day in Seattle and Portland

SEATTLE GROUPS:

Top to bottom:

Left to right: Col. Gustav Anderson, USAT; Darwin Meisnest, vice president, Olympic Steamship Co.; Senator Warren Magnusen; Louis B. Pate, Robin Lines, president, Propeller Club of the United States; Gil Ackerman, American Mail Lines, president of Propeller Club of Port of Seattle; R. J. Albin, chairman, Maritime Day banquet; Mayor William Devin, Seattle; Capt. Alexander Peabody, Puget Sound Navigation Co.; Philip M. Crawford, regional director, U. S. Dept. of Commerce; Quentin Herwig, chairman of World Trade Week and president of Transportation Club. Not shown: Capt. R. Mauerman, USCG, acting commandant, 13th Naval District.

Left to right: R. G. "Bob" Kennard, Markey Machinery Co.; Comdr. Edward A. Eve, Jr., U. S. Coast Guard; Ken Dahlgren, The Texas Co.; Hal Schuyler, Union Oil Co.; Frank Pellegrini; Matt Ryan.

Clockwise around the table: S. J. Swanson, Alaska Transportation Co.; Karl K. Katz (behind Mr. Swanson); Everett Clark, Port of Seattle; Hal Reid, Port of Seattle; A. K. Terry; H. G. Oakley, U. S. Customs; Dewey Bennett, Walmar Trading Co.; J. C. Harper, Pope & Talbot; Jack Cornyn, Girdwood Shipping Co.; Ben Grosscup, Grosscup, Ambler & Stephan.

Clockwise around the table: George W. Peterson, Jr., Todd's; Ray Love, S. & C.; Dick Storrs, American Mail Line; Henry Jacobsen, American Mail Line; George Lober, Sperry; Gordon C. Snyder, Nickum; Capt. Fesmith, Puget Sound Pilots; Jim Gibbs, Marine Digest; Capt. Harald Fitzner, Viking Marine; Bjarne Gulluksen, master, M.S. "Marie Bakke"; A. E. Lee, Interocean S.S. Corp.; George W. Hunt, Tait Stevedoring Co.; Major Robert H. Hall, executive director, Water Division, Seattle Port of Embarkation; Harold W. Webb, Superintending Marine Engineer, Seattle Port of Embarkation.

PORTLAND GROUPS:

Top to bottom:

Left to right: E. E. Shields, president of Portland Shipping Club; Mayor Dorothy Lee of Portland; and Maj. Gen. Frank A. Heileman, Chief of Transportation, Army Transport Service, guest speaker from Washington, D. C., introduced by Mayor Lee.

Left to right: George Hutton, Coastwise Line; R. W. West, S. P. & S. Ry.; H. H. Wrightson, Coastwise Line; Walter D. Brennan, Quaker Line; Capt. J. A. Hazelwood, Commission of Public Docks; Lew Fowler, Merchants Exchange; Doug Cruikshank, Noon Bag Co.; Mrs. H. C. Dyer; H. C. Dyer, States Steamship Co.

Left to right: H. L. Feiock, Consolidated Builders, Inc.; R. A. McNiven, National Lead Co.; Mr. & Mrs. T. J. Murray, Portland Dock Commission, E. J. Hackett, Portland Dock Commission; J. F. Otto, U. S. National Bank; R. L. Cormack, Bank of California; W. A. Peterson, Merchants Exchange; Jack Hetherington, Bank of California.

Clockwise around the table: R. R. Condit, Jr., Pierce Auto Freight Lines; R. R. Condit; D. Digregorio, First National Bank of Portland; M. T. Goddard, First National Bank of Portland; A. C. Fenger, Moore-McCormack; Mrs. F. Dash; F. Dash, American Mail Lines.

D. J. McGarity (center), Director of Port of Portland, and guests.

O. W. Pearson, President of Pacific Maritime Association

PMA Formation Complete

Pacific Maritime Association was officially launched last month as the employer group which will negotiate and administer the seven major coastwise maritime contracts. The new association takes over the functions of the Waterfront Employers Association of the Pacific Coast, the Waterfront Employers Association of California and the Pacific American Shipowners Association, which formerly handled contracts with maritime unions.

President of the new association is O. W. ("Vic") Pearson, formerly Vice President of Marine Terminals Corporation. Henry W. Clark, who was WEA's Vice President and General Manager, takes over the same duties with PMA. Also elected Vice Presidents of the new association were J. B. Bryan, former Pacific American Shipowners Association president, and E. N. W. Hunter, Assistant to the President of Pope & Talbot, Inc.

PMA organization is streamlined to assure quicker handling of business. The Board of Directors delegates authority to four Port Executive Committees, one for each of the major port areas, to control local policy matters. A Coast Executive Committee handles policy affecting the whole coast and makes recommendations to the Board of Directors.

To bring closer relations between employers and workers, the PMA organization plan stresses direct employer participation in all phases of labor relations and in the safety program. Employers take turns in serving on the Longshore Labor Relations Committees and on standing committees for administration of the seagoing contracts.

Henry W. Clark, Vice President and General Manager of Pacific Maritime Association.

Main office of PMA is in San Francisco, with area offices in Seattle, Portland, and Long Beach.

Membership of the group is more than 150 American and foreign operators of West Coast ships, stevedoring companies, terminals and other employers of maritime labor.

Marine Turbines and Gears

(Continued from page 62)

available through casing access holes, of sufficient radii- and weight-adding-capacities to allow correction for the usual amount of unbalance that occurs. Portable balancing equipment is available to determine the position and amount of correction weight with a relatively few number of trial runs. By the use of this equipment steam running balance may often be the most economical method of check balancing, and should always be given due consideration in shipboard balancing problems.

The adding of balance weights or removal of weight should be at the location designated by the manufacturer and in such a manner as to cause no local stressing of parts. Welding of weights on turbine wheels or drilling of wheels for weight removal should not be done.

All in all, the balancing of a turbine rotor should be under the direction of one who knows not only balancing procedure but also is familiar with the construction features of the rotor and the importance of checking the cleanliness and trueness of the rotor and its journals.

(This paper will be continued in August)

New Sales Agents for Xzit and Brickseal

The Coast marine trade will be interested to learn of the important appointment of the well and favorably known firm of Pedley-Knowles & Co. as sales representatives at San Francisco for Xzit fire scale and soot eradicator, Xzit soot and sludge remover, Brickseal refractory coatings and similar products of Xzit Chemical Company and Brickseal Refractory Co. of Hoboken, N. J.

New alliance for service and sales is appointment of Pedley-Knowles & Co. at San Francisco. Pictured are J. N. (Joe) Knowles, Jack Govan, H. P. Gibney, Eric Pedley.

The Xzit-Brickseal organization maintains offices in Los Angeles where Jack F. Govan, president, is headquartered. Out from the East, H. P. Gibney, marine sales manager, accompanied Govan in the negotiations which brought together the chemical specialty manufacturers and the marine supply distributing firm.

Coast visitor of the month was H. P. Gibney, Eastern sales manager for Brickseal Refractory Co. and XZIT Chemical Co., from his Eastern headquarters at Hoboken, N. J. He accompanied Jack Govan, the firm's president, on a Coast marine-industrial tour, highlighted by appointment of Pedley-Knowles as sales agents at San Francisco.

At an informal luncheon at San Francisco's Palace Hotel, Eric Pedley and his partner Joe Knowles expressed their enthusiasm over the acceptability of these 'board ship specialties on the part of Coast port engineers and engine-room officers interviewed in their preliminary contacts. Gibney, Eastern marine sales manager, outlined the firm's success with tanker and merchant fleet operators in the other maritime areas.

Present at an informal luncheon at San Francisco, this group heard details of sales appointment for products of XZIT Chemical Co. and Brickseal Refractory Co. Seated (left to right): J. N. Knowles of Pedley-Knowles & Co.; J. F. Govan, head of the manufacturing organization; Eric Pedley, of the marine-industrial supply firm. Standing: Bern DeRochie of PMR; A. (Tony) Uriarte, Pedley & Knowles; E. A. Rainville, engineering department; H. P. Gibney, Eastern sales manager of XZIT-Brickseal; Lewis A. Deppman, port engineer, Sudden & Christenson, Inc.

Kihn Promoted By Standard Oil

The appointment of A. E. Kihn as manager of its Marine Department has been announced by Standard Oil Company of California. Kihn succeeds J. H. McEachern, Marine Department manager since 1935, who has taken over special duties under the direction of President T. S. Petersen.

Kihn has been identified with Pacific Coast shipping for many years, and is the third in his family's line to become shipping executives here since 1850.

His entire career with Standard has been in the Marine Department, where he started as a file clerk in 1915. A native of San Francisco, Kihn attended the Alameda schools.

During World War I, Kihn was placed in charge of Marine Personnel. Further advancements brought him to the position of assistant manager in 1941, from which he moved to his present position.

A. E. Kihn

C. H. Wheeler Appoints Herbert Johnson

C. H. Wheeler Manufacturing Co., Philadelphia, recently announced the appointment of Herbert G. Johnson as manager of their Heat Transfer Department. He will handle the sales engineering of steam condensers, cooling towers and vacuum equipment.

During 20 years' experience in the power plant field, Johnson has been a consulting engineer, manufacturer's representative and Philadelphia District Manager for the Ross Heater and Mfg. Co.

John E. Carroll

John E. Carroll Becomes Sales Manager for American Hoist & Derrick

John E. Carroll has been appointed General Sales Manager for American Hoist & Derrick Co., St. Paul, Minnesota.

Carroll joined American Hoist & Derrick in 1937 as a District Sales Representative in the Texas, then Chicago, and later West Coast territory. He resigned his sales position to become a partner in the firm of Harron, Rickard and McCone Co., of Southern California, heading the Construction Equipment Division.

Herbert G. Johnson

George Montgomery to L. A. for Crane

The Crane Packing Company of Chicago has recently announced the transfer of George Montgomery to its Los Angeles office. Montgomery will act in the capacity of Sales Engineer, handling all of the products in the wide "John Crane" line of packings, mechanical seals and lapping machines.

The transfer represents the Crane Packing Company policy of representation by highly trained service engineers. George Montgomery started with the company in 1934. His first seven years were spent in the production of the various packing styles. In 1941, he was transferred to the Engineering Department, where he was active in development work on Mechanical Seals of all types. Since early in 1947, he has been with the Sales Department as a Service Engineer in the Chicago territory.

George Montgomery

Officers of Pacific Coast Ship Chandlers Association

Recently elected officers of the Pacific Coast Ship Chandlers Association are A. J. Clark, Jr., elected a Director; C. K. Howe, re-elected President; and I. C. Freeman, elected Secretary.

Dilke Represents American Rope in California

American Manufacturing Company, Brooklyn, N. Y., Manila rope manufacturer, has appointed Charles J. Dilke of San Francisco as their northern California representative. This is the first direct factory representation established by the company west of the Mississippi. Dilke's office and warehouse is located at 383 Brannan St. Dilke was formerly president of the C. J. Hendry Co.

American has been manufacturing rope for 65 years. Zellerbach Paper Company handles the company's twine.

Capt. Wirth of the Navy

After having contributed mightily to the good relationship existing between the Navy and the public in the 12th Naval District, Capt. Theodore Wirth's tenure as District Public Information Officer has been extended for another year. Both the Navy and the public will benefit from this happy circumstance.

Capt. Theodore R. Wirth

Capt. Wirth's record, since graduating from the Naval Academy in 1921, includes service aboard the battleship *Texas,* the destroyer *Bruce* and the gunboat *Panay*—then shore duty at Newport and Charleston—then aboard the U.S.S. *Ontario, Smith* and *Portland.*

While aboard the *Portland,* Capt. Wirth participated in actions in the Coral Sea, at Midway, at Guadalcanal, in the Solomons and at Santa Cruz. After a time at the Naval Academy he was assigned to command the heavy cruiser *Fall River,* and upon its decommissioning became in July 1947 District Public Information Officer.

George Talmadge Joins Pacific Transport Lines

George E. Talmadge has been appointed vice president of Pacific Transport Lines.

Prior to the war he was freight traffic manager of the Panama Pacific Line. During the war he was first director of the Interstate Commerce Commission's Bureau of Water Carriers, regulating the coastwise and inter-coastal trades. He served with the Lend-Lease Administration, the War Shipping Administration and the Office of Defense Transportation, and was appointed special adviser to the Maritime Commission to administer its program for the rehabilitation and re-establishment of private coastwise, intercoastal and territorial shipping. He then became executive vice president of the Ajax World Wide Freight Corp., which serves as eastern general agents for Pacific Transport.

New Enterprise Marine Bulletin

Enterprise Engine & Foundry Co. announces the publication of a new 16-page Bulletin in color, featuring their complete line of Marine Diesel Engines. This bulletin, fully illustrated with photographs, charts and cutaways, describes Enterprise normally aspirated and turbocharged diesels, component parts, ratings and applications. Copies of Bulletin No. 174 are available by writing Enterprise Engine & Foundry Co., 602 Florida St., San Francisco 10, California, or through your nearest Enterprise branch office.

Pennington Elected Vice-President Of International Shipping Federation

First American to be so honored, Maitland S. Pennington, vice president of Pacific Transport Lines, Inc., San Francisco, has been elected vice president of the International Shipping Federation, according to advice from Federation headquarters in London.

ISF is made up of representatives from approximately 40 maritime nations and concerns itself basically with seafaring labor problems. Its present president is the well-known British shipping magnate, Basil Sanderson, M. C., chairman of Shaw, Savill & Albion Company, Ltd., and director of the Bank of England.

Pennington has been prominent in national shipping circles for a number of years. He was one of the original organizers of the National Federation of American Shipping, of which he was vice president until he resigned to become vice president of Pacific Transport Lines, Inc. He is at present a director of the Federation. Locally, he is vice president and director of the Pacific American Steamship Association.

Maitland Pennington

Combustion Engineering's Northwest Sales Office Opened

Combustion Engineering-Superheater, Inc. announces the appointment of H. D. Nickle (above) as manager of the new district office for the Northwest territory including the states of Washington and Oregon. The office is located in the Skinner Building, Seattle.

Edward Issues New Strainer Bulletin

A new Edward bulletin, No. 712 providing information on forged steel strainers has been issued by Edward Valves, Inc., East Chicago, Ind. Edward strainers have an ASA rating of 600 lb. at 850 F. for steam, oil, or vapor, and a hydraulic rating of 1440 lb. at 100 F.

Bulletin 712 contains complete information on dimensions and weights, correct installation, maintenance, and cleaning.

Dick Dawson Opens Own Company

Richard "Dick" S. Dawson recently organized his own distributing company for Henry valves, driers, strainers and related refrigeration accessories. Henry Valve Co. specializes in marine products, and they are approved by Navy, Maritime Commission and Coast Guard. Dawson recently established a wholesale stock of Henry products to supplement refrigeration jobbers' stocks carried at principal ports.


Dick Dawson

Henry makes a complete range of sizes from ¼" to 6" valves in both bronze and iron body, with connections for flare, solder, and welding. Driers and strainers are available in corresponding sizes.

"Dick" Dawson is a former vice president of Alco Valve Company and Henry Valve Company, and is a member of the American Society of Refrigerating Engineers. He is author of *"Handbook of Automatic Refrigerant Controls."*

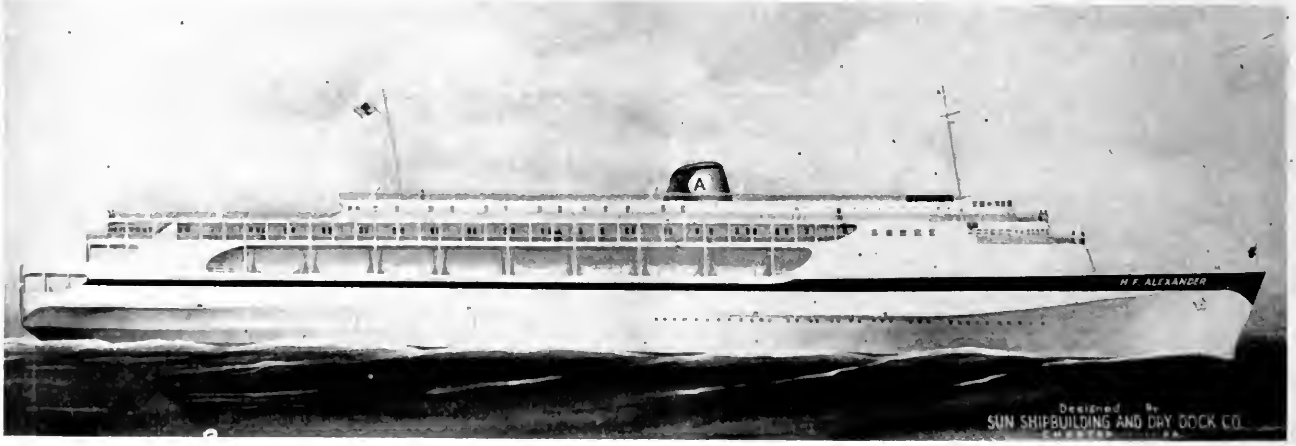
The "H. F. Alexander"

Reprinted from February Pacific Marine Review, in which blueprints and complete description were published, is the drawing shown here of the proposed *H. F. Alexander* for the Pacific Coast Steamship Company.

Alexander announces that the Maritime Commission has approved a $22,000,000 loan in connection with the construction of the *H. F.* and the *Ruth Alexander* for the San Francisco-Los Angeles run.

The ships are to be 563 feet, 18,000 gross tonnage, 25 knot speed. Passenger capacity 382, plus 137 crew and 60 truck drivers. Automobile capacity 22, plus 176 truck trailers for freight.

Artist's profile drawing of the "H. F. Alexander."



Ray Coyne Succeeds Phil Thearle at Fort Mason

Raymond J. Coyne, identified with Army marine engineering activities for the past 29 years, has been named Superintending Marine Engineer of the Water Division Maintenance and Repair Branch at the San Francisco Port of Embarkation.

Announcement of the appointment was made by Lt. Col. S. F. Hyde, Superintendent of Water Division. Coyne succeeds Philip H. Thearle, who resigned to enter private employment.

A graduate of the Oakland public schools and the Polytechnic Engineering College of Oakland and a post-graduate student in University of California Extension School, Coyne began his Army civilian service in 1920 as a senior marine draftsman.

He rose steadily in his chosen field and at the outbreak of World War II he was Superintendent of the Port's Marine Repair Shops. As activities expanded he was placed in charge of the Marine Engineering Planning Section to which was assigned the work of preparing the conversions of peacetime passenger and cargo ships to marine transports. Subsequently he became the Superintending Marine Engineer. During the war period he worked on the conversion of 125 ships. In 1946 the Port Transportation Corps Supply Division set out to establish basic supply procedures for the ships, and Coyne was assigned to the operation as Technical Advisor to establish a table of basic supply allowances for transports. With the special task completed, he was placed in charge of the Marine Repair Shops and it was from this post that he was called to take over as Superintending Marine Engineer.

Special recognition of his wartime services was given Mr. Coyne several years ago when he was presented with the Army Award for Meritorious Civilian Service. He was the first Port employe to receive this high civilian award.

Doing business without advertising is like winking at a girl in the dark—you know what you're doing, but no one else does.

Bethlehem Steel Film Available

"Steel Builds the West," a new industrial film presented by Bethlehem Pacific Coast Steel Corporation, is ready for distribution after having been reviewed by representatives of the local press.

The new picture dramatically depicts the vital part which steel has played in building western industries. This is the first film to be produced by an industry which portrays that industry at work in other major industries and at the same time shows the ultimate function of its product, in this case steel, in building a better standard of living.

Although presented by a private company, the film is refreshing because of the absence of any commercial "plugs." It is a 16 mm color and sound production offered for showings to civic groups, colleges, high schools, clubs, engineering and trade associations, and numerous other public groups. The film can be scheduled free of charge by writing or phoning Publications Department, Bethlehem Pacific, 20th and Illinois Streets, San Francisco.

"Steel Builds the West" was produced by New World Productions, Hollywood.

1949 American Yacht Register

Lloyd's Register of American Yachts has announced that the 1949 edition of the American Yacht Register is now in circulation.

Plans for the 1950 volume are being formulated and a change in policy is contemplated for the lithographic Flag Section of the book. Because of the undue cost of this section, it will be necessary in future volumes to restrict the illustration of flags to those clubs and yachtsmen who are subscribers to the Register, even if only in alternate years.

There will be no change in policy as regards the listing of yachts, or yacht club particulars.

Port of Seattle Appoints Public Relations Director

John M. Haydon has been appointed director of the newly-created department of Public Relations of the Port of Seattle. He is an experienced marine writer, editor and advertising man.

Col. Warren D. Lamport, General Manager of the Port of Seattle, reports that the Public Relations department was created to bring about a better public understanding of the operations of the port.

John M. Haydon, Director of Public Relations, Port of Seattle.

Swett-Stone Corp. Moves

Swett-Stone Corp. of San Francisco have moved their Mission St. office and warehouse to new and larger quarters at 770 Folsom St., between Third and Fourth Sts. The new location is all on the main floor and is centrally located for both the marine and industrial fields served by the corporation.

Manufacturers represented by Swett-Stone include the following: *Manning, Maxwell & Moore, Inc.,* Consolidated Safety Valves, Ashcroft Duragauges, Hancock Valves, American Temperature Instruments; *Mason-Neilan Regulator Co.,* Reducing Valves, Pump Governors and Automatic Control Equipment; *Cunningham Manufacturing Co.,* Air Whistles, Solenoid Valves; *Ilg Electric Ventilating Co.,* Blowers, Fans, Unit Heaters, *Cuno Engineering Corp.,* Engineered Filtration, Auto-Klean, Flo-Klean, Micro-Klean; *National Engineering Products, Inc.,* "Copaltite", Plastic Metal. There are separate stock rooms for the different types of equipment warehoused.

The new location has an attractive front window display, separate offices for sales engineers, stenographers,

auditors, and managers, and mezzanine recreation space. It also has provided shipping facilities with back alley truck entrance and electric hoist.

All Swett-Stone salesmen are engineers and well versed in their products.

At an open house, scheduled for July 8, the new quarters were to be presented to all customers and friends. The entire staff planned to act as hosts for the day. They include Leighton Stone, manager, and Ronald Oldershaw, John Dietzman, Jeff Bickell, Roy Wilkie, and Rosalind Rusch.

Personnel of Swett-Stone Corp. Left to right: Leighton Stone, J. R. Bickell, R. W. Wilkie, John Dietzman, Rosalind Rusch. Ronald Oldershaw was not present for the picture.

Jaxon Engineering Specialties At San Francisco

A group of widely known and popular marine engineers announce the formation of Jaxon Engineering Specialties to engage in the marine and industrial machinery business, with headquarters at 181 Steuart St., San Francisco.

Charles I. Jackson (left) and Alex Johnston.

Jaxon Engineering Specialties is representing Snap-On Tools for the marine trade, and "Farbertite" protective coating for water tanks. The new concern is Pacific Coast and export representative for Artic Chemicals (all-purpose deodorants and cleaners) Armite laboratories Products, Led-Plate (thread and gasket compound) and Armite hard facing welding rods, as well as special alloy pump liners, valves and valve seats. This company has been named Northern California and Export representative for "Sentinel" Anodes (zinc plugs) and also handles Liberty and Diesel engine parts.

In partnership in the organization of Jaxon Engineering Specialties is Alex Johnston, former Chief Engineer, well-known manager and owner of Pacific Marine Refrigeration Company. Johnston served his apprenticeship in John Brown's famous yards at Clydebank, Scotland.

His first assignment was 7th engineer on the United Fruit Company S.S *Ulua* on her maiden voyage. She was later converted to the H.M.S. *Ulua,* a troop ship in the British Navy in World War I. He then served 6 years with the Union Steamship Company of New Zealand obtaining his Chief Engineer's license in 1925. Johnston holds a British Board of Trade license and is a member of the Society of Naval Architects and Marine Engineers, the Port Engineers Society, and national and local refrigeration engineering associations.

Charles I. Jackson, another well-known Chief Engi-

Jaxon personnel. Left to right: Tom Ollerton, Bob Galloway, Jim Crean, Gil Hughes, Charles I. Jackson, Carol Johnston, Alex Johnston.

neer, is in the new firm. He hails from Nashville, Tenn., and his sea career was launched when he went out firing on the historic steamer *Northwestern* of the Alaska Steamship Company 35 years ago. Jackson will be recalled as having served in vessels of the Admiral Line, C. D. Mallory Line, Lake Tankers Corp., Black Ball Line, and Standard Oil Company. During World War I he served as assistant to the Principal Engineer of the Fleet of New Foundland, French Navy. He was Port Engineer for the original Long Bell Lumber Company of Longview, Washington, and during a later period was New England resident engineer of General Motors Cleveland Diesel. He is a charter member of the Port Engineers Society of Los Angeles and was port engineer for Hammond Shipping Company in Long Beach until they closed their operations.

Navy League Meets Navy

Jerd Sullivan, new Navy League President for Northern California, meets Rear Admiral Lynde D. McCormick, USN, Commandant of the Twelfth Naval District.

Official U. S. Navy Photograph

Export Packaging And Damage Prevention

(Continued from page 69)

sent to the shipper with a letter explaining the situation and making suggestions for correction. The ships are equipped with cameras so that the officers may make factual, illustrated reports on all phases of the carriage of the goods and its discharge at destination.

You will note that I have mentioned nothing about approaching the shipper in regard to the package. That is reserved as a last resort. It is only when a complete and factual investigation of all phases of our own operation fail to reveal that the fault lies with us, or with another carrier, that we take up the matter of packaging.

When such action is indicated we are then in a much better position to urge an improvement. We can then honestly tell the shipper that we have done everything possible to get his package to his customer—and ours—but that it is simply impossible to do so until certain features of his container are changed, improved upon, strengthened or whatever may be dictated by the facts of the case. We have found that when we can go to a shipper with our hands clean and with the facts in them they are receptive and cooperative. In this way we have gained improvements in packaging.

While on the subject of shipper contacts as regards packaging, it might be interesting to know that in some cases we have suggested a *downward* revision in packing standards. Several firms have come to us and stated that due to the expense of packing they are unable to compete in Hawaii. In these cases we have gone to the shipper's warehouse and examined his packing. Some of the things we found were amazing. One firm was building a fine crate around a small coil of rope. Another was placing as durable an article as a truck spring in a case. Another firm, acting upon our suggestions, later stated that they had reduced their crating costs as well as the number of employees in their shipping department, and for the first time in years were in a strong competitive position in the Islands.

After the program had been in effect a year, I made another trip to Hawaii and called on the same consignees that I had seen the year before. The change in attitude was remarkable and heartening. There is still much to be done, but we feel that we have embarked upon the right course.

Damage, of course, is not the only source of loss to our customers and to us. Pilferage and shortage join damage to make up the "unholy three".

In the June 4th issue of the *Saturday Evening Post* a most interesting article appeared concerning the efforts of the Security Bureau of New York to suppress pilferage in that city. That pilferage is rampant on the East Coast is pretty nearly common knowledge. Pilferage on this Coast and in Hawaii, though bad, is not on the scale that it is in the East. We are continually investigating pilferage cases for signs of organized criminal effort. Thus far, and I am keeping my fingers crossed, we have found nothing to indicate that there is any pilferage on a wholesale basis. Studies of our claim files fail to show any "pattern". Though our losses from pilferage are high, the individual claim resulting from theft is usually too small to interest a "fence"—a buyer of stolen goods. Our typical pilferage claims on cargoes from this coast will read like this: three pints of whiskey, two pairs of shoes, half a case of Vienna sausage, three sport shirts, half a box of candy bars. Occasionally we suffer a large claim,

but our pilferage figure is the aggregate of many a petty theft. And these are as annoying as they are costly. We combat pilferage by means of watchmen on the docks and in the ships, special lockers in the vessels to protect pilferable cargo and the use of "Small Package Containers". These containers, of our own design, are filled on the dock with small packages that could become lost easily, and cargo of small size but high value. Drugs, small arms, small radios and valuable spices are but a few of the many items on the list for this type of stowage. As a result of these efforts our pilferage is now the lowest of the three classifications.

Shortages of entire packages are of grave concern to us. Shortages are, for the most part, the result of the human factor—clerical errors. These can occur when the cargo is received on our docks or when the cargo is delivered at destination. We are combating this situation by means of a training program for the supervising clerks and others on the clerical staff.

However, another element that contributes to shortages is poor marking on the part of the shipper. If old marks are not obliterated, if the mark consists of a typewritten tag or sticker, if the mark is in variance with that shown on the papers, if the port of discharge is incorrect, the chance of the cargo going astray is increased many fold. Often second hand cartons are used. If that carton bears old pastage stamps the package often winds up in the post office and much delay in delivery results—with annoyance for all. As stated before—watch your marking!

There is one thing that all shippers must realize. Any ocean carrier is up against a problem inherent to the business. That is—how can ten thousand tons of cargo be placed in a ship and yet give everything top stow? Something, gentlemen, has to go to the bottom. By the bottom I do not mean the very bottom of the lower hold, I mean in the bottom of each and every compartment. The cargo compartments of a modern ship are from seven to fourteen feet in height. The average cargo for a voyage consists of heavy durable cargo such as steel, cement, etc. Some semi-durable cargo such as canned goods, bagged goods and similar material. Then there is the fragile cargo; cargo that must be given ventilation; cargo that by its nature must be removed from the vessel first at destination. All of these factors present problems in stowage. Therefore, in packing your goods remember that something may have to be placed on top of your goods. We cannot put everything on top!

I wonder how may of you shippers have ever inquired of your customers the condition in which your goods are being received. It must be remembered that in most cases the consignee files his claim directly with the carrier and the shipper may never hear of it. The shipper thus feels that all is well and that his package is perfect. I have talked to many a shipper who is amazed when we discuss with him the enormity of the damage being suffered by his goods. A letter of inquiry to your customer may bring a reply that will startle you—a reply that may reveal to the sales manager the cause for a market drying up; a reply that may indicate that your goods are being sold in the salvage market. I think all shippers would profit by the information that can be so easily gained.

HE WHO WHISPERS DOWN A WELL
ABOUT THE GOODS HE HAS TO SELL
WILL NEVER MAKE AS MANY DOLLARS
AS HE WHO CLIMBS A TREE AND HOLLERS.

Moore-McCormack Lines

(Continued from page 56)

cargo included some 18,235 cases of pears, 2,248 cases of grapes and 2,245 cases of plums. Thus, when the season is on for shipments of fruits southbound, the refrigerated space is available to move North American fruits to South American markets, and the reverse is true in the off seasons.

Moore-McCormack has also undertaken extensive studies of the problems of packaging and loading, and safety on the piers, which continue to improve the standards of cargo handling. A recent report showed that in three years the frequency of accidents on Moore-McCormack Lines' piers had been reduced by 32.5 per cent.

That the company is soundly managed is perhaps best evidenced by its showing of an increase in earned surplus from $29,970,000 in 1947 to $35,882,581 in 1948.

Officers and directors are as follows: Officers—Albert V. Moore, President; Emmet J. McCormack, Vice-President and Treasurer; Robert C. Lee, Executive Vice-President; Henry P. Molloy, Vice-President and Secretary; George L. Holt, Vice-President; William T. Moore, Vice-President; Gerald E. Donovan, Vice-President; William H. Lalley, Vice-President; Ivan D. Eby, Vice-President; Albert F. Chrystal, Vice-President and Assistant Secretary; S. L. Barbera, Assistant Treasurer and Assistant Secretary; T. G. Burke, Assistant Secretary; George M. Auten, Assistant Secretary; W. W. Dunker, Comptroller; L. G. Farrell, Auditor. Directors—Albert V. Moore, Emmet J. McCormack, Percy J. Ebbott, Robert C. Lee, Henry P. Molloy, William T. Moore, Elisha Walker. Pacific Coast operations are under the management of K. C. Tripp.

Union Oil Tankers

Plans of the Union Oil Company for a new 16,500 ton tanker, mentioned in our "News Flashes" last month, have reached the blueprint stage, but are not yet ready for the calling for bids.

The new ship, which it is hoped will be the first of a series to replace the entire fleet, will, as now planned, be 525 feet long, with a 72 foot beam and 16 knot cruising speed.

It will have several unusual features, including facilities for carrying up to 15 different petroleum products simultaneously, a larger number of cargo pumps than any other tanker, and turbo-electric propulsion.

Insofar as possible all pumps and winches will be electrically operated.

The ship will be a steamer, its boilers producing steam to be generated into 2300 volts for the electric motor which will operate the drive shaft.

Bids will probably be asked late this summer or in the fall, with the vessel expected to be ready for service aproximately 18 months later. The cost will probably run between $4,000,000 and $5,000,000.

M. J. Ryan of San Francisco is naval architect. Capt. John B. Stene is marine manager for Union Oil Co.

California Shipyards Aided by State Legislature

Despite considerable severe opposition to any exemption from the California State sales tax law, the California State legislature passed Assembly Bill 3106 exempting the sale of ships and whatever becomes a component part of them.

The bill introduced by Assemblyman Thomas Maloney of San Francisco had the vigorous support of San Francisco's Marine Exchange and the American Federation of Labor.

Support had previously been given to a broader bill by the Marine Exchange's Vendors and Shipyard's Committee headed by Louis Ets-Hokin. When this bill, introduced by Senator Arthur Breed of Alameda failed of passage in the State Senate, support was thrown to the Assembly Bill, which having passed the Assembly, was adopted by the Senate shortly before the session's adjournment on July first.

If the Governor signs the bill it becomes law on next October first. It is hoped that his signature will be secured although he previously pocket-vetoed a similar bill two years ago. There exists today, however, a prime reason for his approval since the state of Washington recently adopted broader exemptions a few months ago as an aid to its ship yards.

The bill adopted in Sacramento carries the following exemption from the State sales tax.

" the sale of and the storage, use, or other consumption in this State of watercraft for use in interstate or foreign commerce involving the transportation of property or persons for hire or for use in commercial deep sea fishing operations outside the territorial waters of this State, and any sales of tangible personal property becoming a component part of such watercraft in the course of constructing, repairing, cleaning, altering, or improving the same, and charges made for labor and services rendered in respect to such constructing, repairing, cleaning, altering, or improving."

Compensation Act

(Continued from page 71)

together and subtracted from the total benefits available for the purpose of determining the net sum due the injured person or his representatives. Now, those sums paid are exclusive of any award for permanent disability or partial disability. You can see, therefore, that a self-insuring employer or authorized carrier might very well be required to pay a great deal more in total compensation than the limitations that appear to be prescribed by the Act. The burial benefit has been raised from $200 to $400.

The Act also contains penalty provisions to cover the employer's failure to make periodical payments of compensation when due, or his failure to provide appropriate medical attention when necessary. Agreements of compromise, settlement or waiver are absolutely invalid unless they are first approved by the Commission, so that for all intents and purposes, the employee is fully protected from his own failure to insist upon his legal rights. The same rule will be found in most State compensation acts. Assignments of compensation are invalid, and the compensation is exempt from the claims of creditors.

Logarithms Explained

(Continued from page 73)

want to suprise the inspectors." George was feeling better now.

"Yes, of course you can. But do not try it. They want to be sure you can work problems longhand first. Stick to your longhand unless you have a lot of figuring to do. You will not always have a table of logs handy also. But here goes for the stay bolt. It must have an area of, say, 2.782 square inches. What is the diameter? We look in the log table and find the log is 444357 and the one digit at left of the decimal makes its characteristic zero. (Fig. 2). For division we subtract the log of .7854 which has a minus 1 characteristic. In subtracting a minus we change the sign or, minus a minus is plus. The subtraction cannot be made unless we borrow a 1 and thus have a —1 above. The plus 1 and the —1 give zero. Dividing by 2 to get the square root we have a log 0.274633 with a corresponding number in the tables of 18820. The zero characteristic means one digit to the left of the decimal and we have 1.8820 inches diameter of the stay bolt. Simple, isn't it?"

McCoy turned away and growled "I'll take vanilla."

George Cambell's face lighted up. "That square root sure looks easy. I am going to try it, and some cube root too."

"Yes," Farran said, "and sometime I will show you how to use the slide rule and even make one." He turned to McCoy. "Mac, maybe you had better have Cambell here work on that anchor hoist before we strike rough weather. That will take some of this mathematics out of him. Be sure the Bosn's mate checks any rigging George has to do. We don't want to lose that nigger-head over the side."

1949 Issue of Ship Register

The 1949 issue of the ship register published each year by the American Bureau of Shipping is now available to subscribers. It is the 81st annual volume of the "Record of the American Bureau of Shipping", and contains almost 2,000 pages. The new volume tabulates detailed data on approximately 15,000 merchant vessels of the United States over 100 gross tons and outline data on 5,500 foreign flag vessels engaged in commerce with the Americas.

Of special interest and value to the shipping industry is the typical inboard profile plans of vessels constructed for the U. S. Maritime Commission. Also, the Maritime Commission symbol designation which has been added to the detail "List of all merchant vessels of 2,000 gross tons and over built by each shipbuilder in the United States since 1914", together with hull numbers.

A separate listing of all American ship owners is included, together with the names and gross tonnage of vessels owned by each. The name and location of shipbuilding and repair plants is tabulated, and the number of building ways and capacity of dry docks and marine railways. The list of changed names of vessels alphabetically indexed by all former names, is most useful in tracing vessels.

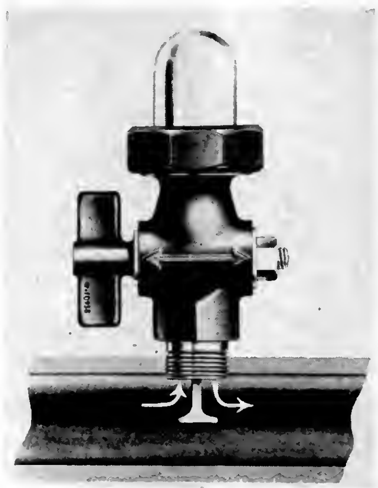
"The Record" is kept up to date by supplements issued twice a month, containing changes to existing vessels and additions of new vessels. There is also a Special Report Service that is issued *daily* to subscribers who wish information more quickly.

Keep Posted

New Equipment and Literature for Yard, Ship and Dock

Sight Glass with Valve Developed by Worthington—

The clarity or turbidity of transparent liquids flowing under pressure through pipe lines can now be observed by means of a valve type Sight Glass, designed and manufactured by Worthington Pump and Machinery Corporation.



Differential pressure is established across the deflector to allow some of the liquid to circulate continuously through a glass observation bowl. A special feature is provided by the valve which permits the removal of the observation bowl for cleaning.

Originally designed for observing the clarity of hot water passing through Worthington Hot Process water treating systems, the valve type Sight Glass can be used in any system through which transparent liquids flow.

Interior Beauty and Sanitation in One Operation

Paint processes are now available that kill rot, rust and germs and replace them with non-porous, waterproof films that wash like glass and provide porcelain-like light reflection and beauty.

Hundreds of combinations of chemical, atmosphere and temperature conditions can be specifically met by over forty chemicals and paints that have been developed for the purpose.

Complete literature and details on the method of diagnosing surface maintenance problems and selecting the proper chemicals and coatings to solve them can be had on request from Steelcote Manufacturing Co., St. Louis, Missouri.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

500 Sansome Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

....issue. Page No...................

....

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....

(Identify by name of manufacturer and catalog)

NAME..

BUSINESS..

ADDRESS..

....

New Committees of N. A. M. E. Sections

The new chairman, Harold C. Hanson, Pacific Northwest Section, the Society of Naval Architects and Marine Engineers, has appointed the following committees to serve until May, 1950:

Meetings Committee: H. E. Lovejoy, chairman; R. H. Barnes, R. G. Kennard.

Welfare Committee: R. R. Cunningham, chairman; A. G. May, J. W. McGuire.

Engineers Licensing Committee: F.G.Greaves, chairman; T.M.Rowlands, G. C. Nickum.

Model Basin Committee: W. H. Watkins, chairman; J. L. Sweetin, H. I. Chatterton, L. S. Baier, J. M. Dyer, M. G. Reese, G. H. Stebbins, W. C. Markey.

Papers Committee: F. E. Blumberg, chairman; G. C. Snyder, P. E. Forsythe, G. A. Guins, T. A. McLaren, C. J. Nordstrom, and R. B. Madden.

Committee on Affiliation with Puget Sound Engineering Council: F. G. Greaves, chairman.

Membership Committee: J. L. Sweetin, vice chairman; G. C. Snyder, A. J. Squire, A. E. Farr, G. J. Ackerman, R. P. Mitchell, J. P. Long, W. L. Williams, H. Davies.

Tom Forster, new chairman of Southern California Section, Society of Naval Architects and Marine Engineers, has appointed the following committees to serve until May 1950:

Papers Committee: A. O. (Bert) Pegg, chairman; W. Lambe, W. C. Ryan, W. A. Harrington, J. E. Marriner, C. L. Dean, G. B. Newby, A. O. Woll.

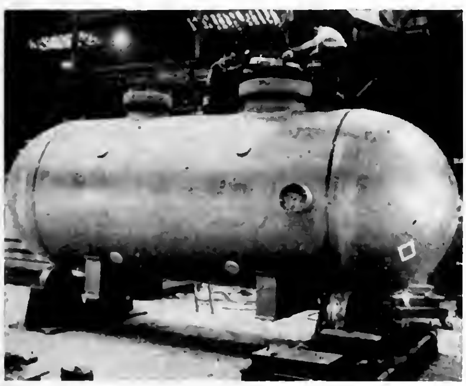
Student Committee: Dan Dobler, chairman; D. N. Long, A. DeFever, R. P. Crump, R. B. Jarvis, R. H. Owens, C. W. Stose.

Membership Committee: H. E. Pickering, chairman (vice chmn., Natl. Comm.) Bert L. Hale (Natl. Comm.) Geo A. Bradford, A. J. Maloney, J. D. Carr, C. Davies, W. A. Johnson, M. Rados, C. T. Solomon, F. M. Young.

Welfare Committee: Karl French, chairman; A. R. Pegg Sr.; H. J. Summers.

High Pressure Test Vessel for Navy

Quick opening type cover being lowered into place on high pressure test vessel built by The Babcock & Wilcox Company for the U. S. Navy's Underwater Sound Reference Laboratory at Orlando, Fla. Four studs on each side mark location of windows to be put in during assembly at Laboratory.



A 60-ton high pressure test vessel built by the Babcock & Wilcox Company at its Barberton (Ohio) plant, for the U. S. Navy, has been shipped to the Underwater Sound Reference Laboratory at Orlando, Fla., officials of the company said.

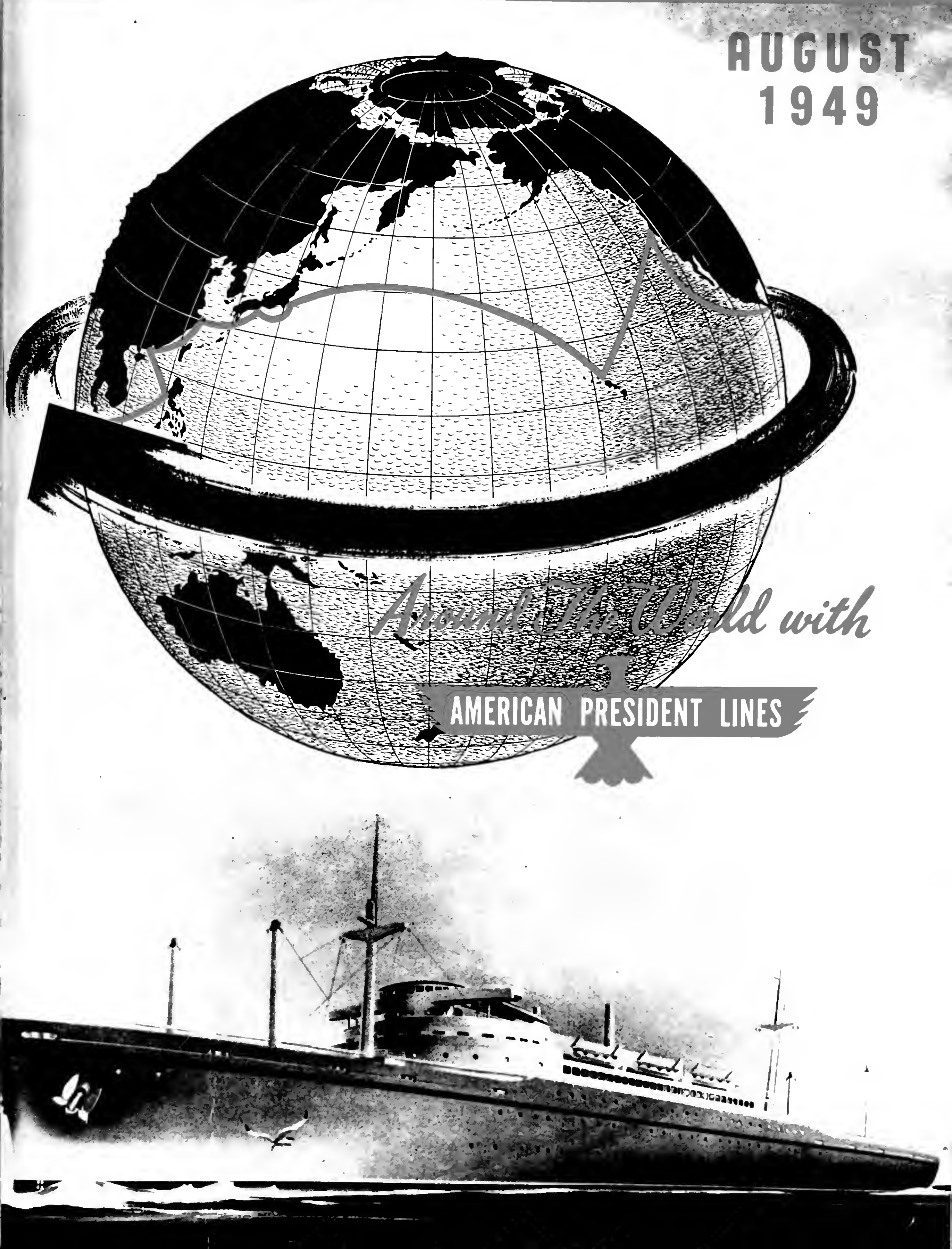
The vessel, which is more than 25 feet long and has an inside diameter of more than 8 feet, was designed specifically for Sonar measurements. It was fabricated of 4-inch high tensile steel plate with hemispherical heads at each end. There are two openings of the breech lock type for quick removal. The interior is fitted with diaphragm and rails for support of supersonic testing devices. When assembled, the vessel will have 8 small round windows to permit a view of the interior while testing takes place.

Fabrication of the vessel required elaborate and accurate layout, with extreme care in locating the rails to conform with the theoretical centerline of the vessel. To facilitate installation in the field, the centerline was transmitted by means of instruments to the ouside of the shell to locate placement blocks, thus insuring the accuracy required for alignment on the foundation supports.

The vessel was fully x-rayed and stress relieved and was hydrostatically tested in the shop to a pressure of 2,000 psi.

Pacific MARINE REVIEW

AUGUST
1949



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Pacific Marine Review

Far Away

THE WEST has been so busy growing up during recent decades that it has overlooked an infringement on its interests. The Biblical reference to the distance between the East and West should not apply to our two coasts.

Too many people cannot see across the country, and in their shortsightedness they set up obstacles of one kind and another which may affect their own welfare. Such obstacles are many, and deliberate.

For instance, there is no doubt of the value of intercoastal shipping lines to the economy and defense of the nation; yet a barrier in the form of a $15,000 round trip toll (more or less) is assessed at Panama for a service that costs but a small part of that amount.

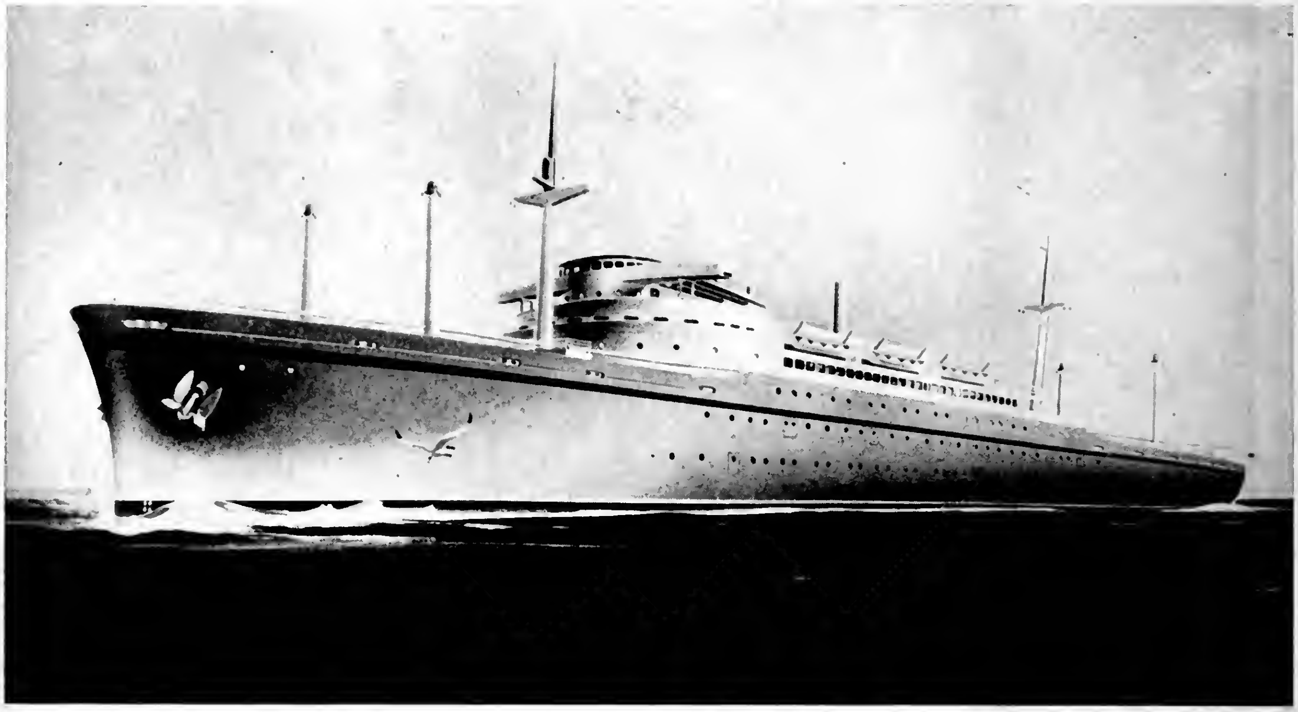
Again, rail freight rates to port areas are set at a level that keeps ship traffic down while somewhere else in the country the difference must be made up. This is especially unfair to the ship lines, who gave their all in the war while other services absorbed their trade. Rate supervision is for the benefit of the whole country, and should not have the effect of restraining the West, whose upsurge is an important element in national prosperity.

Another instance of obstruction is the so-called excise taxes; not the taxes themselves, which are terrific, but the fact that they are *based on distance,* which places the West at a disadvantage. As an example, a manufacturer in California who uses wool in his product pays a *tax* of $80.19 on a carload to the Boston market, where it is processed and made into yarn and cloth. A car of that cloth back to California will carry a tax of $44.46. As the finished product returns to the Eastern market we add another tax still of $37.17, a total of $161.82. In the case of lumber the total tax bill from Eureka, Cal. to New York is $17.00; from Louisiana it is only $11.00.

There is no added service from the government for this tax money, such as cost for added mileage. The tax is just a penalty for distance—a penalty on the West. Can it be that the chance for shipbuilding in the West, where productive effort is greater, is being stymied by government-created obstacles like taxes on distance and Panama tolls?

Possibly the West itself is at fault in not requiring a fairer representation in important groups like the House Merchant Marine Committee (25 members) which has only two from the West. The Transportation Association's Transportation Committee (of 34) has not a single member from the western half of the United States. Not much different are the directorates of such as the U. S. Chamber of Commerce and the National Foreign Trade Council. Certainly western interests are not being adequately protected.

The "far-awayness" of the West is one measure of its lead in the vanguard of progress. The East should shorten that distance.



Artist's conception of American President Lines' new Round-the-World steamer.

American President Lines' Round-the-World Ships

EDITOR'S NOTE: Complete description of passenger accommodations will be contained in a second article on these vessels to appear in the October *Pacific Marine Review*.

George Killion, President.

ONE OF THE MOST FAMED shipping routes of the world is the round-the-world service of the American President Lines; it is the ultimate in touring achievement. Before the war there were 14 ships assigned to this route, but only two, the *President Polk* and *President Monroe,* were returned after their war service and reconversion. The present round-the-world fleet of nine vessels includes five ship types, with varied speeds, capacities and accommodations. Six of them are owned by the company and three are chartered from the Maritime Commission. They call at 25 ports in 14 countries.

On last March 28 at New York Shipbuilding Corporation, Camden, N. J., the keel was laid for the first American passenger liner to be started since the war. It was American President Lines' *President Jackson* for the round-the-world service, and was followed by the keel-laying, in the same yard, of the *President Adams* and *President Hayes.* These three splendid ships will replace the three chartered vessels, and will place in this route the Presidents *Polk, Monroe, Buchanan, Harding, VanBuren, Jefferson, Jackson, Hayes* and *Adams.* The *Polk, Monroe, VanBuren* and *Jefferson* are C-3 type, the *Buchanan* and *Harding* are Victorys, and the *Jackson, Hayes* and *Adams* will be P2-S1-DN1-V2000.

These new ships, designed specifically for the service with just the right balance of passenger and freight space

M. J. Buckley, Senior Vice President.

allotment, will be faster (by three knots) than the average for the route, have more advanced provision for freight handling, and many improvements in such functional equipment as air conditioning and sound deadening. For instance, the crew's quarters will be completely air conditioned and temperature in the refrigerated cargo compartments can be lowered to 10° below zero.

The vessels are designed by Naval Architect George G. Sharp and will have the following PRINCIPAL CHARACTERISTICS:

Length overall	536 ft.
Length, between perpendiculars	500 ft.
Breadth	73 ft.
Draft	29½ ft.
Shaft horsepower	Normal 12,500 (Max. 13,750)
Displacement	19,600 tons
Deadweight	10,600 tons
Passengers—Floor Beds, Sofas and Upper Berths	228
Speed	19 knots, cruising
Crew	Approximately 178
General Cargo Capacity	419,000 bale cu. ft.
Refrigerated Cargo Capacity	57,000 net cu ft.
Cargo Deep Tank Capacity	48,000 net cu. ft.
Fresh Water	206 tons
Fuel oil (98% full)	2,429 tons
Clean Salt Water Ballast	194 tons

Tourist Travel and Trade

Tourist travel has a dollar-and-cents significance in our national economy. It is an important means for the development of trade. We like to sell our goods abroad —and in fact we must do so to support one half of the people in our cotton South (and West), a third of those in our industrial East, a fourth of our agricultural families and the industries that cater to them. Passenger travel creates much of the money exchange that pays for our exports, for our imports from other lands fall far short of our export values—values that we must increase in the future. So we need travel—and cargoes, cargoes and travel. We need *world-wide* travel and cargoes and the Round-the-World service of American President Lines gives just that.

In vast, overseas areas from Manila to the Red Sea this is the only passenger-carrying service under the American Flag. Thousands of American shippers and importers relied on its clock-like regularity over a 25,000 mile route, carrying the American Flag and American commerce to 23 ports in 14 countries. In addition to San Francisco and Los Angeles, New York and Boston, the regular route includes Havana, Cristobal, Balboa, Honolulu, Yokohama, Kobe, Shanghai, Hong Kong, Manila, Singapore, Penang, Colombo, Bombay, Suez, Port Said, Alexandria, Naples, Genoa and Marseille.

It is not easy to estimate the value of this great service to the United States. The goodwill engendered in world ports and the examples of American living which it offers have an uplifting effect on other peoples; and the acquaintance with world conditions which our tourists and crew members acquire will also be beneficial. But the dollar values of the service to American industry is something that *can* be calculated. For instance, in the 16 years preceding 1940 the Round-the-World service earned and distributed to American suppliers, shipyards, and personnel, some $66,000,000 in freight revenues and $22,000,000 in passenger revenues.

One item alone among the expenditures on this route is fuel oil—$14,000,000.

That hundreds of millions of dollars worth of the products of American farms and factories have benefited in no small way from the developments of our trade abroad, while the employment of thousands of seamen, stevedores, shipyard workers, dock employees, warehousemen, truckers, office staffs, and ships' officers has contributed to the growth of the Merchant Marine, as has the training of officers and crews.

Public Rooms and Passenger Accommodations

The main dining room is a spacious apartment 44 feet fore and aft by 70 feet in the beam, with an offset 14′ by 40′ on the after bulkhead to house the stair landings, the elevator shaft and the entrance trunks to the galley. Doors to the galley are opened by electric eye. Those on the port side open only into the galley, those on the starboard side into the dining room. There is a

Arthur B. Poole, Vice President and Treasurer.

clear deck area of 2500 square feet after deducting this offset. A room of this size and shape should lend itself very nicely to decorative treatment and with modern air conditioning and adequate illumination will make a very pleasant and appetizing eating place.

The dining saloon is below, and except under most extraordinary conditions, all passengers may be seated for dinner at one time.

The deck is carpeted and the ceiling sound proofed so that service is quiet and is performed without confusion or noise. You will not be conscious of all of the moving about that is necessary for rapid and efficient and courteous service. All doors from the galley will operate automatically without noise or clatter, either from trays being pushed against the door or from swinging of the door against the door jamb.

The lighting effect in the dining saloon is being given special attention. The outboard sides of the dining saloon will give the appearance of looking out into the sunlight through slightly frosted glass. Special equipment is being installed for the broadcast of music which will allow of the speakers being installed in such numbers and in such locations as will provide complete coverage without any suggestion of excessive volume.

Tables are being arranged for 2-somes, 4-somes, 6-somes, and 8 for the Captain's table. Banquettes have been provided for the outboard sides of the dining saloon.

The lounge is designed for additional use as a place of worship on Sundays and will also be used for moving pictures and for such other entertainment as is provided in the evening. The lounge is quite extensive and extends from the promenade on one side of the ship to the promenade on the other side. It opens onto the promenade deck and in addition into the Club room. It will be exceptionally well furnished to provide the maximum of comfort.

The Club Room is immediately aft of the lounge and extends for a height of 2 decks. On the starboard side immediately over the club room bar, is a balcony of considerable extent which is reached by a very artistic curved stairway. The balcony will contain enclosed cardroom and an open space similar to the mezzanine of many hotels. In addition, it will contain a writing room of considerable size.

Immediately aft of the club room is the swimming pool. Doors from the club room lead to the area of the swimming pool beach. Other doors lead from the club room to the promenade, port and starboard of the club room.

All public rooms have sound proof Marinite ceilings and are air conditioned with temperature set by the air conditioning machines and not available for control by passengers.

All joiner work is by Martin-Parry, with Johns-Man-

— On the APL route —
Japan (Mt. Fuji, Lake Kawaguchi)

— On the APL route —
Top: Luzon, Philippines (Lake Taal)
Bottom: Honolulu (Aloha Tower)

— On the APL route —
Italy
(the Leaning Tower of Pisa)

ville Marinite the outstanding surface material. Marinite is a light weight, incombustible solid panel material, of high insulating value, made of asbestos fibre with an inorganic binder. Marinite Marine veneered surfaces will be in the passages and passage stairways. Passenger staterooms will be Marinite with selected hardwood veneer on exposed sides. Public rooms also will be Marinited.

The passenger sleeping apartments are all outside rooms with the exception of eight on the upper deck. Every passenger room is equipped with private toilet, wash basin and shower with running hot and cold fresh water. Every passenger bedroom is equipped with an automatic dial telephone for intra-ship communication and for connection through radio to shore or other similarly equipped ships.

A modern laundry is provided and equipped with all the latest machinery to take care of all passenger needs.

Features of Staterooms and Public Rooms

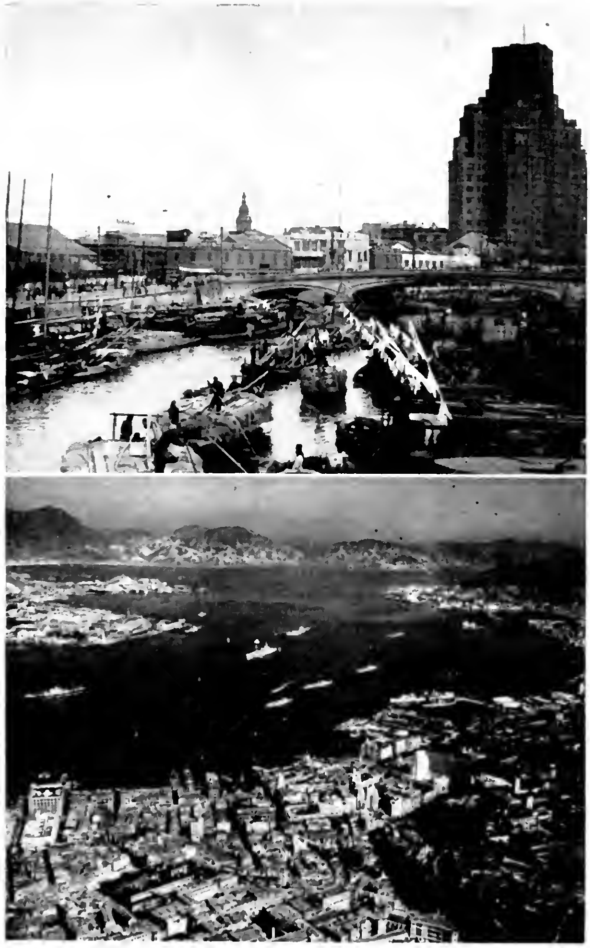
(Pictures on following Pages)

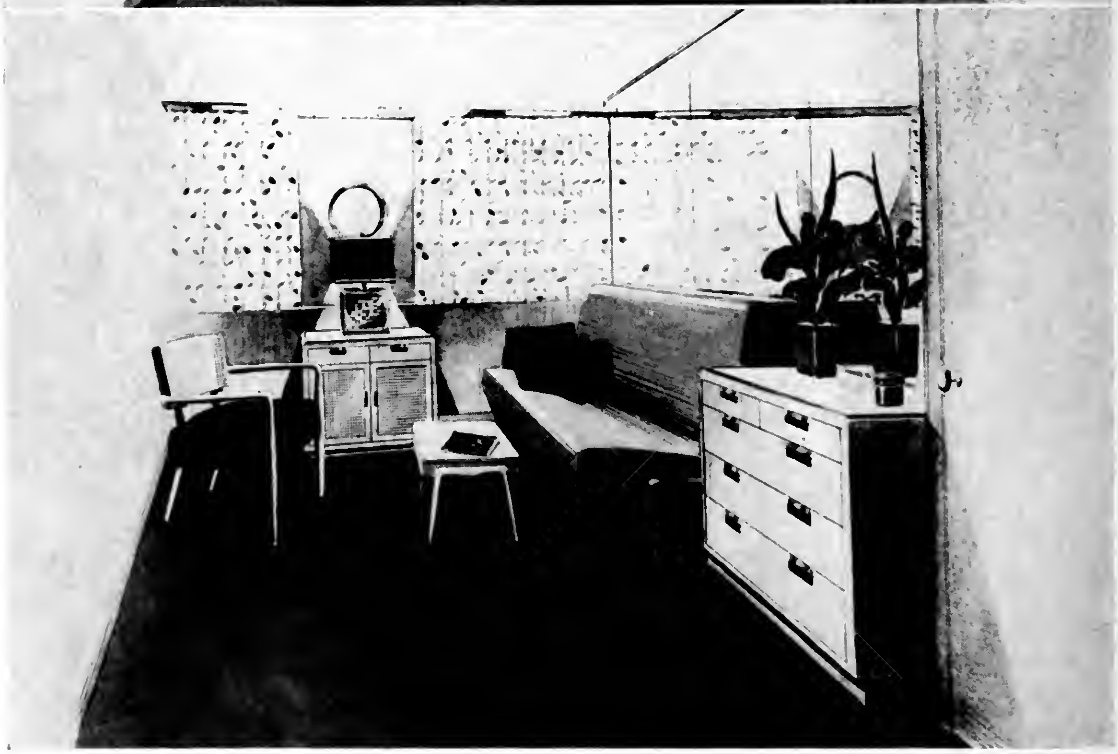
The radial room is designed with one sofa bed and two berths, an upper and a lower on the opposite side of the room. It is an outside room with a single port. The room has a private bath as do all the staterooms for passengers on these vessels. Some rooms are equipped with tub baths with shower over, although most of the rooms are fitted with showers without the tub. The bathroom has attractive checkered tile with a bit of color and is non-skid. This stateroom is carpeted wall to wall. The bulkheads are of fire resistent material finished in light shades of veneer wood. Liberal use of mirrors is evident from the picture. These mirrors have a very faint tint that reflect a pleasing light. The coffee table in the picture is a combination coffee table-vanity bench, the coffee table top being hinged, to uncover the cushion seat below. The lighting is mostly of the cove type and has been given special attention. A number of these rooms interconnect through sliding doors with the room adjacent to form either a two-room suite for people traveling together or to provide a living room-bedroom combination through arranging of the portable furniture. Rooms are completely air conditioned, the control being at the finger tips of the passengers. The air conditioning unit is hidden over the doorway to eliminate from view this usually objectionable piece of equipment. A wardrobe is installed for each passenger and a full length mirror is attached to either one of the wardrobe's doors or to the door leading to the bath room.

The inside rooms are intended either for single occupancy or for two people. There is one sofa bed and one pullman bed over the sofa. There are two wardrobe

(Please turn to page 42)

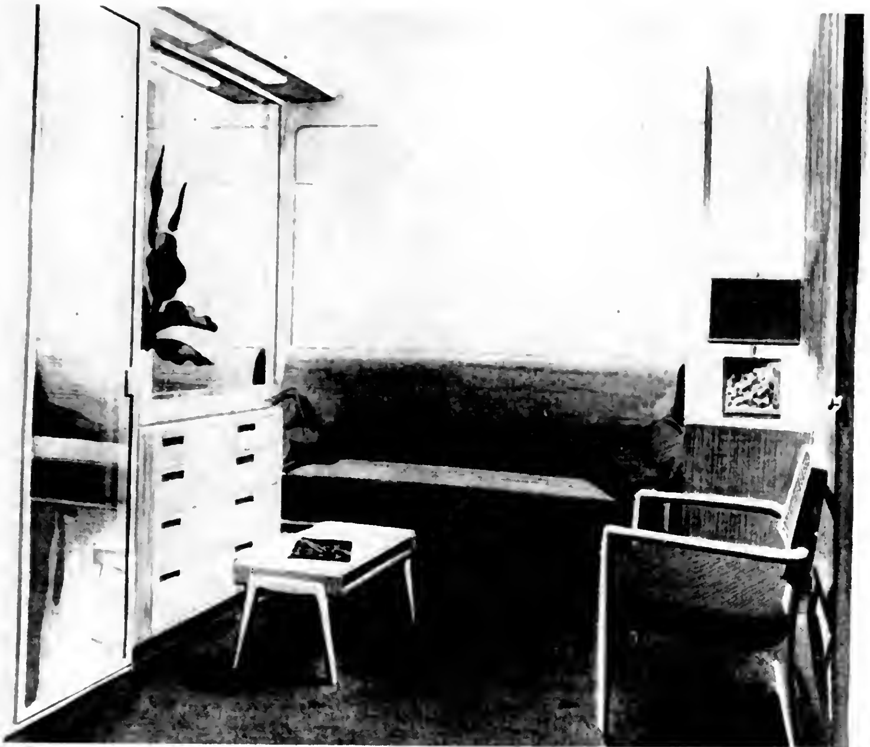
— On the APL route —
China
Top: Soochow Creek and Broadway Mansions, Shanghai.
Bottom: Hong Kong Harbor from Victoria Peak.

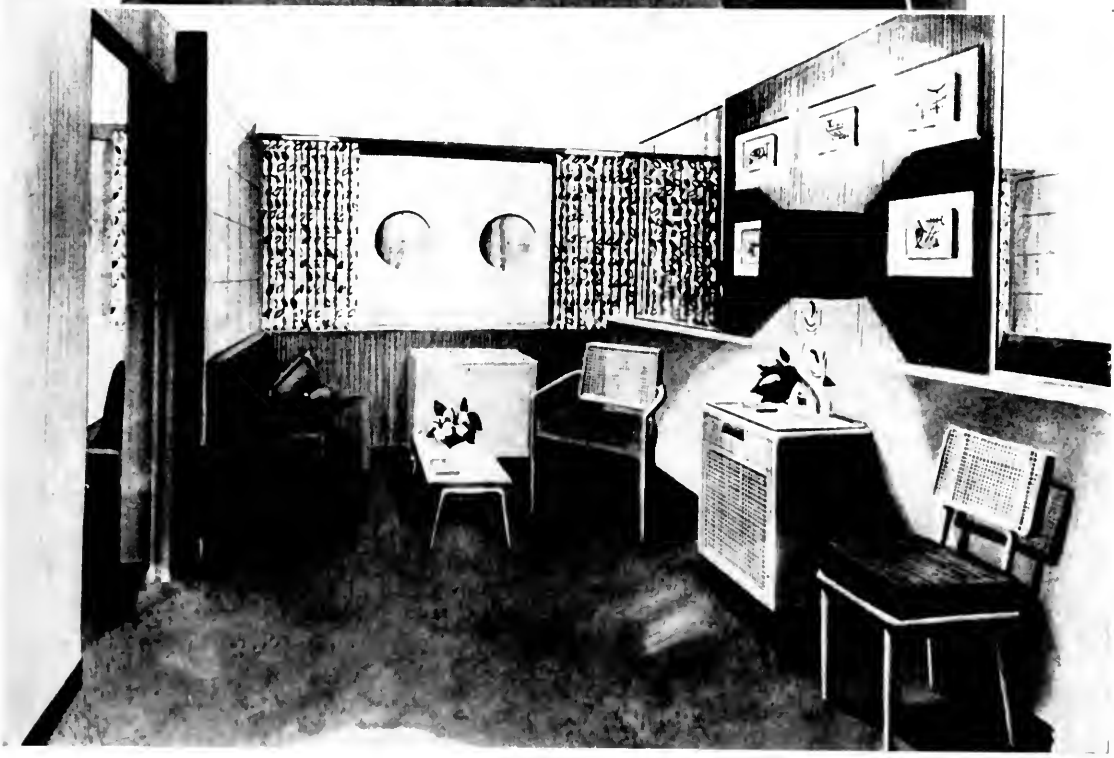




Top: Radial room located on the upper deck. (See page 39)

Bottom: Radial room located on the promenade deck.





Top: Inside room, intended either for single occupancy or for two people. These rooms have the same appointments and equipment as the radial rooms on the opposite page except that they have showers only. (See pages 39 and 42).

Bottom: Four-passenger room on the upper deck. These rooms extend out to the shell of the ship.

American President Lines

(Continued from page 39)

lockers with full length mirror on one locker door.

Four-passenger rooms on the upper deck extend out to the shell of the ship. The berths are arranged so that three lower berths are provided and only one upper. The interconnecting feature exists in these rooms. A number of the rooms are fitted with bath tubs, and these rooms, in addition, have the feature of trunk storage space which is not available in other rooms.

Hull Description

The ship is to be a steel cargo-passenger vessel with curved stem and cruiser stern. There are to be three complete decks—upper deck, "A" deck and saloon deck—and flats at various levels. A promenade deck is to extend over the upper deck amidships for about one-third of the vessel's length and, above this, shorter officers' and navigating bridge decks.

The double bottom will extend from the forepeak bulkhead aft to frame 179 and be subdivided into tanks for carrying fuel oil.

E. D. Flaherty,
Vice President and
Operating Manager.

Machinery is to be located amidships with four holds forward and three aft arranged for stowage of dry, refrigerated and liquid cargoes. Cargo is to be handled through hatches and side-ports using overhead gear and conveyors.

The ship is designed to have a total displacement of about 19,600 tons on a loaded draft of 29 ft. 6 in. in salt water, and a total deadweight of about 10,600 tons of which about 7,800 tons is cargo deadweight. Construction is to be under special survey of the American Bureau.

The vessel is to be built on the transverse framing system, of all welded construction except shell seams outside of inner bottom which are to be riveted, with butts welded. It is provided that special care be exercised in welding to avoid notch defects and discontinuities in main structural members or members attached to same, in general thickened plates rather than doubles to be fitted where required. The architects have written into the specifications knowledge gained from wartime and postwar experience with welded ships.

Nine watertight bulkheads divide the hull into ten main watertight compartments. First, starting from the bow is the conventional forepeak; then in order, holds No. 1, 2, 3 and 4; then the machinery space, holds 5, 6 and 7, and last the afterpeak. Watertight bulkheads No. 1 and No. 2 forward are complete from the tank top to the upper or weather deck. Bulkheads 3, 4, 5, 6 and 7 are complete from tank tops to "A" deck. Bulkheads 8 and 9 extend from tank top to upper deck.

The compartments thus formed are in turn divided into many spaces for various uses. The fore peak houses the bos'n's stores, the anchor chain locker, a salt-water ballast tank; and a room on the first flat accommodating the motors for two vertical capstans on the upper deck and the resistors for the controls of these capstans and of the anchor windlass.

There are many items of hull equipment which deserve mention. Seaboard Machinery Company's "Mege" quick opening hinged hatch covers; Cargocaire hold conditioning; main and other air compressors and reciprocating and centrifugal pumps by Worthington; Sharples lubricating oil purifier and heaters; C. H. Wheel-

— On the APL route —
Top: Rangoon, Burma, (Shwe Dagon Pagoda)
Bottom: Cairo, Egypt (the Sphinx)

er's steering gear, windlass and air ejectors; Lake Shore cargo winches; and Crane Company's manifolds for fuel oil transfer, heating coils and drainage systems. Bottom paint will be of a different make on each of the three vessels so that a fair comparison can be made.

Carrier Centrifugal Refrigeration

The importance of refrigeration and air conditioning for both passengers and crew can scarcely be over estimated.

The ship's stores refrigeration, for example, will make available fresh fruits and vegetables, domestic meats, poultry and dairy products during the entire world voyage.

The extensive cargo refrigeration facilities, with a number of different temperatures available, will provide shippers of perishables with the exact type of cold storage to meet the requirements of their products. Since the movement of perishables via fast ocean freight is steadily increasing, with frozen foods becoming a particularly active item, the cargo refrigeration is expected to provide a major source of income to the vessels' operators.

In step with the modern trend, the air conditioning will assure healthful comfort to every space occupied by passengers and crew. Not only are the public rooms air conditioned, but the staterooms and crew's living quarters will also be served, with the occupants provided a means of regulating the temperature to individual taste at the turn of a dial. In view of the world itinerary, which will include stops at such colorful but hot spots as Havana, Panama, Singapore, Penang, Colombo and Bombay, the vessels will provide a perpetual oasis for all hands. Even the trip through the Red Sea will be a real pleasure cruise and not the blistering experience it is on old fashioned vessels.

Two compact Carrier Centrifugal Refrigeration Machines are to be installed aboard each of the three new liners. These units will be electrically driven by a 550 hp motor. Each consists of a compressor, prime mover, speed increasing gear, cooler and condenser, all mounted on a single base.

Edgar M. Wilson,
Vice President at
Los Angeles.

— On the APL route —
Top: Bombay (the Taj Mahal)
Bottom: Rome (the Coliseum)

The centrifugal units will handle both high and low temperature requirements simultaneously. They will supply Freon-12 refrigerant to fan-coil evaporators in ten cargo compartments totaling 76,000 cubic feet. Temperatures may be maintained in any of the compartments within the range of minus 10° to plus 50° Fahrenheit. At the same time, the Carrier units will supply Freon-12 to the ship's stores refrigeration systems, chilled brine to the galley boxes, and chilled water to the various air conditioning central stations serving public rooms, staterooms, and crew's quarters.

In addition to meeting the varying requirements of four distinctly different services, the Carrier units have been designed to provide capacity regulation to match the loads.

Centralization of refrigeration has resulted in remarkable savings in space and also provided major operational advantages. This advanced technique developed by Carrier's Marine Department engineers, is being used for the first time aboard the APL liners.

Main Galley

The main galley which prepares meals for the entire complement of passengers and crew is all electric, and is directly aft of the main dining room on the saloon deck and directly over Hold No.4 which is completely devoted to dry and refrigerated galley stores. On the tank tops this space embraces a large refrigerated chamber on the port side for fruits and vegetables; tanks for milk and for

W. K. Varcoe,
Vice President,
Freight Traffic

fresh water amidships; and butter and eggs, ice cream and beverage chambers and an ice-cream making compartment on the starboard side. On the 14 foot 4½ inch flat are: fresh water and distilled water tanks amidships; poultry, fish, chilled and frozen vegetable rooms, starboard; and a large meat room port.

On the 22 foot 9½ inch flat are the dry stores, the ship's laundry, and the clean linen lockers. These stores are loaded through side ports and athwartship passage on A deck and brought down to the various levels by vertical conveyor and elevator. They are all very conveniently arranged both for ease of stowage in loading and accessibility from the galley.

There is ample room for stowing large quantities of refrigerated foods and the space allotted to the various categories indicates the planning of well balanced menus. The galley takes a space of 40 feet by 70 feet and is very well arranged. From forward aft on the starboard side are arranged. the cold pantry, the bakery, and the pot and pan scullery. Port side houses the dish and glass scullery, the butcher shop with its service refrigerator; and the vegetable preparation room. Against the forward bulkhead is a coffee pantry, the cook's office and a silver room. At the after bulkhead is a silver cleaning room; the conveyor and elevator system for loading and unloading stores, and the access stairs to A deck above and the flats below.

The system of doors into the dining room is arranged for entrance from the galley only on the starboard side, and exit from the dining room only on the port side. Above the galley on A deck are the passenger entrance lobby, purser's office, purser's workroom, novelty shop and some crew accommodation.

Machinery

In the machinery space, which occupies 70 feet of the length, and at the saloon deck level directly aft of the galley, there are flats port and starboard with fore and aft passageways directly outboard of the machinery space casing and giving access to: the deck officers' mess, and the stewards' mess starboard; and the crew's mess and petty officers' mess port. A pantry on each side facilitates service to these messes. On this same level amidships is the engineers' shop and side ports for loading fuel oil and engine room stores. On the A deck level above this space are the fidley, engineers' stores, fan room, electricians shop and crew accommodations.

It is noteworthy that the modern plant for fueling the passengers and crew of this ship occupies approximately the same proportion of the length of the hull that formerly would have been occupied by the vessel's steam propulsion plant in the days of Scotch boilers and "up and down" engines. The modern high pressure water tube boilers and high speed reduction gear turbines of this ship are all enclosed with ample room for accessibility in a space less than one-third that occupied by the crew and passenger fueling plant mentioned above. In other words, it takes much less of the revenue cubic of a modern cargo and passenger liner to fuel 12,500 horses than it does to fuel 406 men and women. Most of the fuel for the horses is carried in the non-revenue double-bottom tanks whereas the fuel for passengers and crew occupies practically the whole of one hold.

Safety

This design is stable and seaworthy in every respect and is a three compartment job. That is, three compartment must be flooded to sink the ship. Every precaution is considered in the equipment for detection of and extinguishing fire. Life preservers or life saving suits are provided for everyone aboard. Six Welin life boats, one of them a powerful motorboat equipped to tow all the others are hung in gravity davits served by electric boat winches. The combined capacity of these boats will accommodate all persons aboard. Special hawse pipes will be fitted bow and stern for mooring to buoys. On the bridge all the most modern navigation equipment will be fitted including Sperry gyro compass, a radio direction finder, radar, and loran. Various signal devices are Henschel equipment, and include electric whistle control

Boyce Luckett,
Assistant Vice
President,
Freight Traffic.

system, running light tell-tale panels, sound powered telephone system, shaft revolution indicating system, mechanical engine order telegraph system, and electric rudder angle system.

For fire protection, the C-O-Two Fire Equipment Company has developed a jumbo smoke detecting cabinet which brings the smoke detecting lines from 41 separate spaces to one centralized observation point.

General Electric Propulsion Machinery

This vessel is designed to be driven by a single screw and has a "contra-guide" form rudder post to transform some of the angular velocity of the water in the propeller stream into forward-motion energy for the hull. The propeller shaft is turned through double reduction gearing by a cross compound steam turbine designed to deliver 12,500 shp at 92 rpm of the propeller shaft when fed with steam of 600 psi gage and 840° F. total temperature at the throttle. The design will be such that the turbine will operate continuously when delivering 13,750 shp at about 95 rpm of the propeller shaft.

The main turbine will consist of one high pressure General Electric turbine and one low pressure turbine, each connected through a flexible coupling to a suitable pinion meshing into the first gear of the double reduction gear. An astern element capable of delivering 80 per cent of ahead torque at 50 per cent of the full speed ahead propeller revolutions.

General Electric is also furnishing the main and auxiliary switchboards, lighting and power distribution panels, motors and controls for deck and underdeck machinery, search lights and flood lights. Three 600 KW General Electric turbo-electric generators will take care of power requirements for the above, and also for ventilating, electric galley service, and ship's lighting.

Babcock & Wilcox Boilers

To provide steam for the turbine and for other uses, two steam boilers will be installed in the engine room. These will be of the Babcock & Wilcox single pass header type with water cooled furnaces, superheaters, and Ljungstrom air heaters. Each boiler will be fired by four B & W Iowa type wide range Y-jet steam atomizing oil burners. These are the first American ships to be equipped with Ljungstrom air pre-heaters. Forced draft fans are Westinghouse. The air preheater will be installed in the uptake of each boiler. Each of these boilers will have approximately 8100 square feet of water heating surface and at normal rating will generate 53,500 lbs. of steam per hour at 625 psi and 850° F. total temperature with feed water at 375° F. Each boiler will be capable of sustained operation while generating 80,000 lbs. of steam at these same pressure and temperature conditions. At its normal rating the standard efficiency of each boiler will be at least 88 per cent.

John M. Diggs, Vice President, Passenger Traffic.

John T. Danaher, Assistant Vice President, Passenger Traffic.

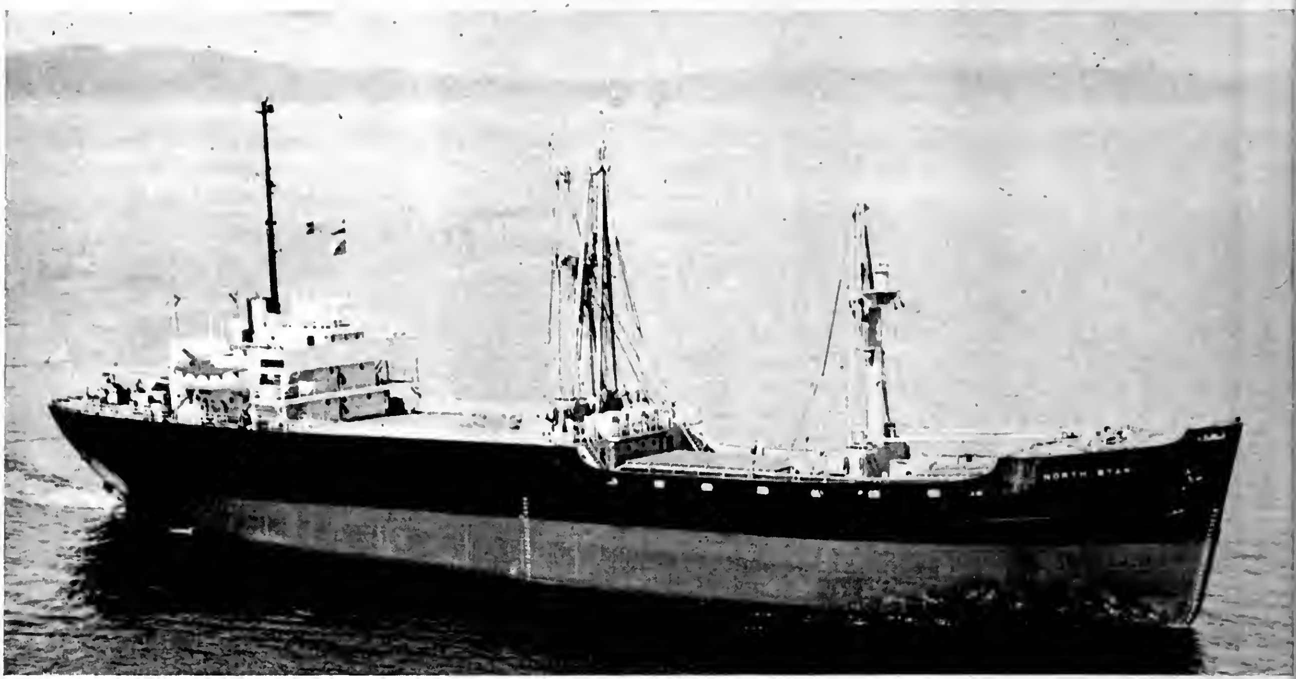
Forced draft system of operation will be used with pneumatic type automatic combustion control. Stack velocities will be accelerated by additional air supply to soot remover controls.

The main low pressure turbine will be mounted on an exhaust directly into the main condenser and the auxiliary turbines will exhaust into one auxiliary condenser. Condensate from both condensers will be pumped through the standard closed system of feed water heating, picking up heat from the inter- and after-condensers of the air ejector, the first stage heater, the gland drains, the second stage heater, and the deaerating heater which acts as an enclosed hot well providing a positive head on the feed pump, and so to the boiler drum.

Summary

Complete single class passenger and cargo liners with a good turn of speed, these ships are proportioned to produce sea-kindly vessels well calculated to deliver a comfortable and enjoyable sea voyage. Every care has been exercised to assure a healthy variety in the cuisine and to achieve artistic pleasing interior decorative effects.

With a fleet of such ships in operation on their Round-the-World Line, the American President Lines can offer American travellers all the amenities of life in a modern first class hotel plus all the thrill and interest of a voyage through temperate and tropic seas to the great ports of four continents.



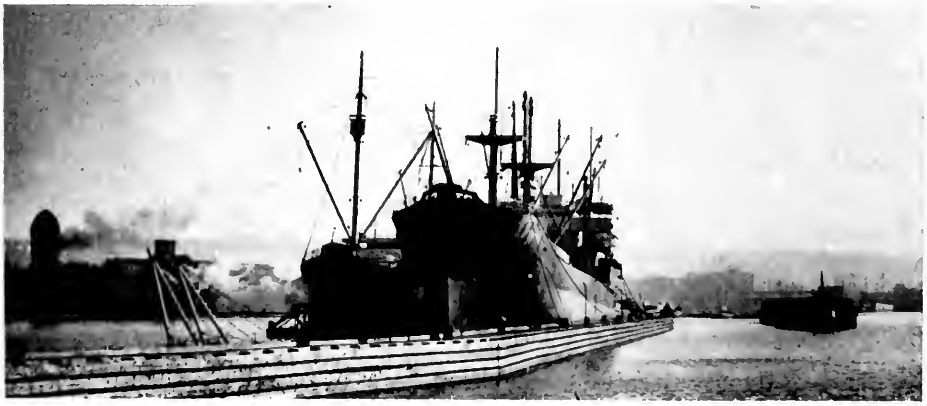
Following partial conversion at the Seattle Division of Todd Shipyards Corp., the "North Star" is shown being readied for initial runs to isolated communities in the Arctic and Bering seas for the Alaska Native Service.

M. S. "North Star" Converted for the Ice Run

FIRST of two interesting steps in conversion of the motor vessel *Coastal Rider* has been completed at the Seattle division of the Todd Shipyards Corporation. The *Coastal Rider* has been renamed the *North Star* and replaces a 17-year old wooden vessel of the same name which performed yeoman service during her active lifetime and has now been retired. The *North Star* will undergo the second phase of her conversion following her initial run to isolated communities of the Bering and Arctic Seas. She was expected to leave Seattle about August 1 for Point Barrow and other points for a voyage of several weeks.

The new *North Star* is being converted from a standard C1-M-AVI cargo ship to a combination cargo-passenger vessel in accordance with plans and specifications prepared by Carl J. Nordstrom, naval architect and engineer of Seattle.

A salient feature of the conversion work lies in the heavy plating at the bow for reinforcement in navigation through ice. The vessel is scheduled for complete



The 17-year-old wooden "North Star" alongside her successor, the new steel "North Star" at Todd Shipyards Seattle Division.

U. S. Navy Photo

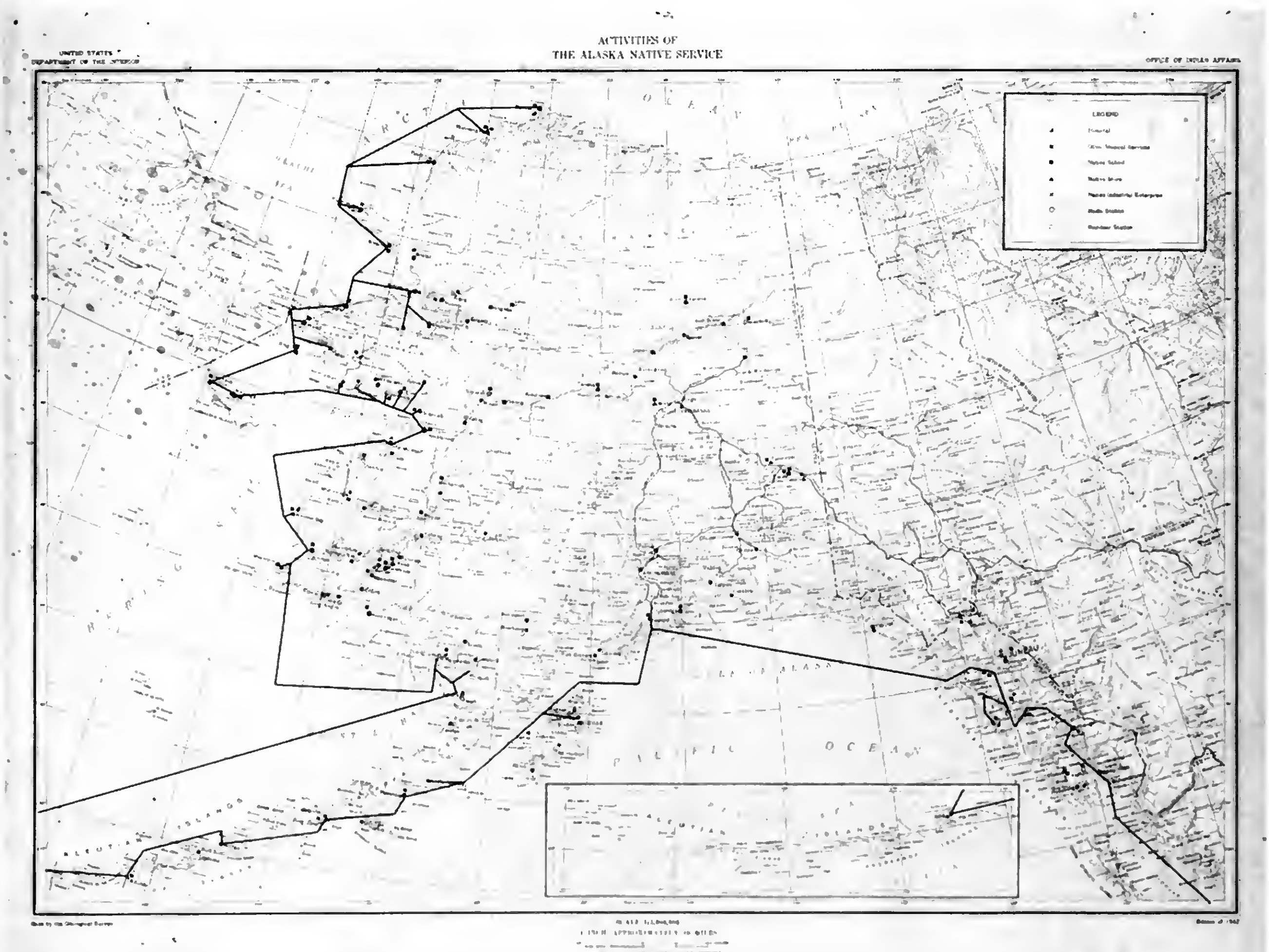
renovation for her rigorous duties in the northern waters.

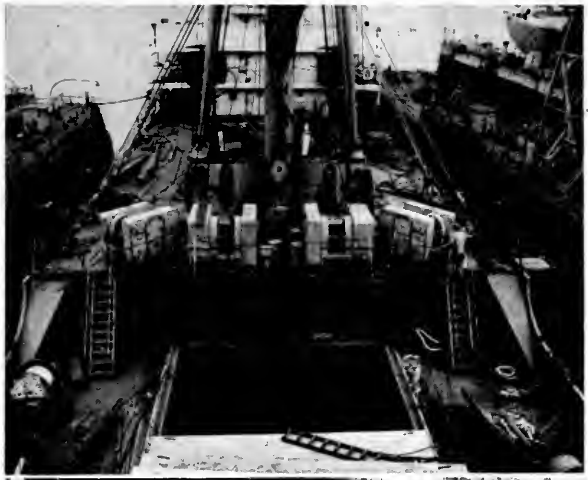
About one-third of the work has been completed. This includes the extension of the poop deck and the shell of the ship in order to form an enclosed space approximately 85½ feet long which upon her return is scheduled to be fitted out with passenger spaces and accommodations, shortening of the length of the No. 3 hatch at the second deck and providing a trunked hatch from main to poop deck, and the removal of the mast house and all rigging gear serving No. 3 hatch and raising to poop deck level from the main deck.

Work already completed also includes construction of refrigerated cargo compartment of 9000 cubic feet capacity in the forward end of the No. 3 cargo hold; the addition of an extension to the mizzenmast and the installation of Sperry Mark II, Model O radar equipment; additional stiffening between the main deck and the tank top to carry additional weight of new steel erection; removal of an oil burning range and the installation of a new Lang electric range; overhaul of the main and auxiliary engines and the drydocking of the vessel for underbody painting, checking of rudder, tailshaft clearances and other routine work.

Work scheduled in the conversion program for the vessel's return from her first trip includes the fitting out of extended poop deck space to provide for the accommodation of 32 passengers, provisions for a new poop deck house and extension of the boat deck fitted out to serve as an observation day lounge, installation of additional life-saving gear consisting of one 40-person oar-propelled Welin steel boat at port and starboard, laying of 2½-inch caulked wood deck over the entire poop deck and boat deck, relocation of the forward end of the wheel-house aligned with bridge front and installation of new Kearfott sliding windows. Other work planned for the second availability includes six-tier wood-capped railing around the poop deck and the boat deck, installation of a new stern anchor gear consisting of a 2240-pound stockless anchor with combination capstan and anchor windlass with chain locker at stern of the ship, removal of existing refrigerated cargo compartments in No. 4 hold and building in of new fresh water tanks. Additional conversion work planned includes installation of coils, diffusers and con-

Heavy lines on the map show the almost unbelievably long and tortuous route around Alaska to which the "North Star" is assigned. The posts of the Alaska Native Service reach out through the Aleutians and back up to Point Barrow, which is on the North Pole side of Alaska.





Top: New poop deck extension on the "North Star" showing the old mast house and the rigging arrangement relocated on the extended poop deck.

Bottom: Placement of heavy bow plating on the "North Star" at the Seattle Division of Todd Shipyards Corp.

trol equipment in the refrigerated cargo compartment in the forward end of No. 3 cargo hold; outfitting the vessel with a new steel lighter and a Diesel-powered wooden motor launch, both of which will be stowed in the well deck abreast of No. 2 cargo hatch, and rearrangement of crew's quarters to provide better accommodations and to suit the requirements of the trade.

The *North Star* will carry a complement of 40, including 17 persons in the deck department, 10 in the engine department, 12 in the steward's department and 1 in the medical department. The 338-foot ship was built in 1945 of steel construction throughout, with Diesel engines aft, and grosses 3805 tons. She was transferred to the Alaska Native Service by the Maritime Commission and will carry at least three times as much freight as the old *North Star.*

The old *North Star* was built in 1932 and made 47 round trips to Alaska carrying Alaskan Native Service personnel and supplies to the federal institution's schools and hospitals which, for the most part, are located in isolated communities not otherwise served by commercial transportation. The old vessel also served as flagship in 1939 and 1940 when she made two trips to the Antarctic on the Byrd Expedition.

Particulars of the converted vessel include:

Length Overall .... 338′-8⅜″
Length on Designed Load Waterline .... 320′-0″
Length between Perpendiculars .... 320′-0″
Breadth, Molded .... 50′-0″
Breadth, Extreme .... 50′-3⅝″
Depth, Molded, to Top of Main Deck
Plating at Side .... 29′-0¾″
Draft, Molded, to Designed Load Waterline .... 18′-0″
Draft to Bottom of Keel at Designed
Load Waterline .... 18′-0$\frac{1}{32}$″
Draft to Subdivision Load Line, Molded .... 21′-0″
Main Engine, Hamilton .... Single Acting Solid Injection Diesel With Normal Rated Shaft HP of 1700 at 180 RPM
Total Fresh Water - Gallons
(Potable) .... 67,752 Gallons 252.1 Tons
Total Fresh Water - Gallons
(Non Potable) .... 19,720 Gallons 73.2 Tons
Total Refrigerated Cargo - Bale Cubic Feet 10,000
Total Dry Cargo - Bale Cubic Feet 216,275

Book Review

"Ports of the World"

The third edition of *Ports of the World,* edited by Sir Archibald Hurd, was recently published by The Shipping World Limited, Effingham House, Arundel St., London, W.C. 2. The price is 40 shillings, postage free.

This publication, of approximately 1,200 pages, gives information on important ports of the world. It has been possible for the first time since the war to include up-to-date particulars of the majority of the Japanese ports. New features which have been added for the first time include tables of steaming distances. Further information about the incidence of public and local holidays has been incorporated in the text. Other features include a table of foreign currencies and a 16-page map section.

The arrangement of the present edition follows the same general lines as before. The first section embodies particulars relating to ports in the United Kingdom and Eire, arranged in alphabetical order, and the remainder of the book gives details of Commonwealth, Colonial and foreign ports, arranged according to continents and countries. A comprehensive alphabetical index of overseas ports enables instant reference to be made to any particular port.

Report on Radar Operation

By W. E. STRATTON
Master, S. S. America Transport

SPERRY RADAR has proven itself a reliable anti-collision device and a major instrument for navigation along coasts and in confined waters, supplementing and yet independent of all other navigational devices.

Repeatedly, at all times, in fog, thick or clear weather, passages along coasts or in confined waters with a shortage of navigational references, we have found the use of radar to have greatly expedited the vessel's movements. It has increased safety and eliminated or reduced delays which otherwise could not have been avoided.

During such adverse conditions as we have often encountered during the nine months of operation, we found that it truly revolutionizes the science of "thick weather" navigation. The following examples will serve to illustrate its usefulness and practicability.

During the passage through San Bernardino Straits, P. I., on November 29, 1948, we experienced frequent heavy rain squalls reducing visibility to less than one mile, strong tide rips, currents to five knots, and traffic. Navigation was accomplished with no more difficulty than if it were clear weather. Actually it was even simpler, the radar being available at all times for checking and/or determining accurately and instantly the vessel's position. By using the scope in the manner of a simple maneuvering board, "it showed the course being made good resulting from the set of the currents, the course necessary to pass a specified distance off, speed, and distance to go before abeam." It proved to eliminate much of the dead reckoning and conjecture otherwise necessary under such trying conditions.

On December 21, 1948, we arrived off Keelung Harbor, Formosa, in thick fog, visibility less than 100 yards. The Radar Scope clearly showed the entrance and the details of the harbor and ships which were laying across the fairway dangerously obstructing traffic. We came to anchorage by radar off Sento Sendo San 190°, distant 500 yards. The only details of the harbor seen visually were Buoy No. 1 marking the extremity of the Eastern Breakwater which was left close by on the port hand, and Buoy K less than 400 feet distant from our anchorage. Without the high degree of resolution that this radar is capable of, entry into this congested harbor of limited maneuvering room at time of poor visibility would be totally impossible.

On March 10, 1949, Hong Kong Harbor and approaches from Lamock Islands, 180 miles to the Eastward, were obscured under a thick blanket of fog with visibility never greater than three miles. Heavy steamer traffic and numerous fishing junks in pairs or groups along the the route in, required frequent course changes, which thus eliminated the danger of possible collision which would have been likely without radar. At all times it was also possible to fix the vessel's position by radar ranges and bearings of mountains 10 to 20 miles away.

We arrived off Wanglan Island, seven miles SSE of Hong Kong Harbor, with visibility of two- to three-tenths of a mile, closing in to zero at times. On various slow and stop bells, course was shaped for Lei Mun, entrance to Hong Kong Harbor. Passing 0.3 mile off Tathong Point, 0.3 mile off Hak Kok Tau, both points were dimly visible when abeam but unidentifiable except by radar. At one time between Lamtung Island, eastern side of Tahong Channel, and a distance of two miles ahead, over 30 fishing junks and small craft were observed in the radar scope. Not more than one or two could be seen at a time visually. Using the whistle frequently and adjusting course and speed, a channel was found permitting passage. Entering Lei Mun, 500 yards wide, the banks on each side were the first landmarks clearly seen. Figuring conservatively, 15 or 16 hours were saved, as the fog blanketing the harbor entrance did not lift until the following morning when the ships lying outside, fogbound without radar, entered.

Numerous other examples can be cited during these nine months where the use of radar proved itself invaluable:

Off Point Arguello ... Dense fog, and heavy traffic.

In Santa Barbara Channel ... Heavy rain and snow storm, visibility nil, heavy traffic.

San Francisco ... Fog conditions with reduced visibility, heavy traffic.

San Joaquin River ... Hazy, buoys missing or out of position or lights out.

Columbia River ... Frequent moderate snow flurries with visibility less than 1 mile, buoys missing or out of position, heavy traffic.

Yokohama ... Hazy, confined waters with limited maneuvering room, currents, various courses passing Fort Area, heavy traffic.

Kobe ... Approaches from seaward via 1 mile swept channel through mine field. Buoys removed without notice, missing, off station, lights out or weak and irregular; strong currents at turning point, heavy traffic, with weather conditions where fog, mist, drizzle, or light rain has always limited the visibility to less than 3 miles for the three passages we have made in and out of this port.

Tsingtao ... Weak seaward approach lights and shortage of adequate harbor lights.

Bonham Strait, south of Yangtze Kiang ... Confined waters, strong currents, numerous course changes, inadequate lights, heavy traffic, with fog conditions often prevailing.

Nansei Shoto or Southwestern Islands ... Heavy rain, no lights.

Verde Island Passage, P. I. ... Narrow, hazy, light

drizzle, frequent course changes, shortage of lights, strong currents.

Suriagao Strait, P. I. ... Narrow, hazy, light drizzle, frequent course changes, shortage of lights, strong currents.

Canigao Channel, P. I. ... Narrow, buoys missing, dangerous shoals 1.2 miles off track.

Mindoro Strait, P. I. ... Shortage of adequate lights, shoals, variable currents, long courses between aids for fixing the vessel's position.

Visayan Sea, Jintotolo Channel ... Confined waters, numerous course changes, few navigational references, lights irregular or of low visibility, strong variable currents, numerous shoals, heavy traffic.

Besides its use for navigation the radar proved itself a reliable anti-collision device. For all passages across the Pacific and in the Far East in fog, drizzle, light to heavy rain, snow flurries, the radar scope clearly revealed all traffic and enabled a plot to be made of the other vessels as to course and speed which made possible the taking of proper measures to avert collision.

We are convinced that radar is necessary for the safe progress of a vessel in Far East waters; that it is the only practical method for coastwise and inshore navigation where lights are few, far between, and unreliable, and when exhibited are frequently irregular or of low visibility ... the four or five Radio Direction Finder Stations operating are of such low power that we have yet to find them of any help .... A chain of soundings for these waters as obtained by Fathometer or any other method is of no value for position finding but may actually give a false sense of security that would prove dangerous. This arises from the fact that many of the surveys are no longer considered accurate due to the date and source of survey. Also, many areas show an evenness of bottom, other areas show no depths at all that can be expected, and large discrepancies exist between the given and actual due to silting that has occurred since the date of the survey.

Prior to the days of radar aboard vessels it was a commonly recognized fact among shipmasters that navigational aids and devices available for conducting a routine passage from one port to another involved, to some extent, the human element and the consequent possibility for error. From the examples cited as to how radar proved itself valuable time and time again, it can easily be seen how radar has increased safety. The accidents that may happen when radar is improperly used, or when too much dependence is placed on it to exclusion of other precautions, we feel should have no deleterious effect upon the universal adoption of radar.

The value and accuracy of radar for navigation during such adverse conditions depends primarily on interpretation of return. The basic concept of radar, its limitations and capabilities, and proper tuning of the set, must be thoroughly understood by those who are depending on it for the information it presents. At any time that it is felt that the vessel's position is indeterminate, extreme caution should be observed. By the exercising of proper caution and common-sense judgment radar will bring to the user tremendous advantages in safety and vessel operation.

Very little trouble in operation has been encountered, although tuning is critical under extreme conditions of rain, sleet or snow, or reflections from tops of waves ("sea return") which may affect clearness of picture-presentation on the scope, masking small targets. During periods of heavy precipitation we have not yet found this radar subject to a complete blackout, land masses and large targets still showing clearly to a distance of 6 to 8 miles. Most navigational references need not necessarily be lost, if a lower setting, a shorter sweep, and the anti-clutter circuits are used singly or together to minimize the interference.

We are convinced and willing to forego the increased ranges to 40 miles possible with other types of radar, operating on the 3,000 megacycle band, and settle instead for the 6 to 14 miles we have experienced, and retain the high degree of resolution always obtainable with this type of radar when you need it most, i. e., for navigating narrow and confined waters.

We feel that for off-shore waters the primary purpose of radar is surface search to be used (1) as an anti-collision device seeking out targets on the water and giving early indication and warning of their presence so that proper action may be taken minimizing the danger of collision; (2) for coastwise and inshore navigation, the principal advantage here being that it can be used at night and during periods of low visibility, when orthodox methods fail. We have found that a wisely operated radar is admirably adapted for doing just this and a little ingenuity on the part of the radar operator, if he knows where he is, will enable him to obtain and maintain an accurate position at all times, at a distance approximately 15% greater than his line of sight; and lastly and probably most important, (3) a vessel radar-equipped, under most conditions, should never be fog-bound, but should be able to continue under way even at reduced speed in rivers and passages to anchorage or to berth, eliminating the resulting costly demurrages and uncertainties of schedules due to adverse weather.

The operational hours have been held at a minimum by using the radar only when it is needed most: in thick weather and/or for navigation. However, the radar log shows 507 hours, which averages out almost two hours a day. It can easily be seen what its use has meant to this vessel. From the standpoint of vessel operation alone, as to the ability to maintain schedules, it may pay for itself within a year, having already saved two full days. During this time very little trouble has been experienced, except for a loose connection, 1 tube, and 3 crystals which didn't need replacement but increased performance.

The Hoover Commission is reported to have found that executive agencies of the government operate 133 printing plants and about 250 duplicating plants at a cost of $25,000,000 a year, in addition to the approximately $50,000,000 spent each year by government executive agencies. *$25,000,000 a year would put the laid-up fleet in operating condition, or complete the Mariposa and Monterey, but Congress can't afford it.*

French Line's Motorship "Wyoming" In Service

WITH the arrival of the modern, speedy motorship *Wyoming* at Pacific Coast ports, the French Line's express freight and passenger service between the Pacific Coast and Continental Europe is resumed. The *Wyoming* was built since the war in the Loire Shipyards at St. Nazaire specially for the French Line's North Pacific service. The 10,200 ton *Wyoming* is powered by two Sulzer diesel engines developing 12,000 horse power, and maintained a speed of better than 17 knots on her voyage from Antwerp to the Pacific Coast. She is scheduled to make the return voyage from Los Angeles to Antwerp in 22 days.

General Steamship Corporation Ltd. is general freight agent for the French Line on the Pacific Coast.

The *Wyoming* has the finest possible passenger accommodations for 12 passengers consisting of four single cabins and four double cabins, all of which are equipped with private bath and every modern convenience. In addition, there are large comfortable public rooms for the passengers which are fitted out in the best French Line style and tradition.

As the *Wyoming* has been specially designed for this trade, ample provision has been made for the carriage of fresh fruit and frozen products. Over 118,000 cubic feet of space is devoted to the carriage of fruit and 14,000 cubic feet for frozen cargo, as well as 354,000 cubic feet available for general cargo.

The *Wyoming* is the first of three W-type vessels built in French shipyards since the war for the Pacific Coast trade. The second vessel will be the *Washington* due at Los Angeles August 25th and the third vessel will be the *Winnipeg* due on the Pacific Coast early October. These three vessels will initially maintain monthly service from Pacific Coast ports to Belgium, Holland and France and later will be supplemented by a fourth vessel to round out the fleet.

The *Wyoming* is the second vessel of this name to sail in the French Line's Pacific Coast service. Her predecessor was built in France in 1929 and arrived on the Pacific Coast on her maiden voyage in 1930. At the beginning of the war the former *Wyoming* served in the service of the Allies and was lost in the Atlantic by enemy submarine action early in 1942.

Since the war the French Line has maintained monthly sailings between the Pacific Coast and Europe with Liberty-type vessels purchased from the United States Government. As soon as possible work was commenced on new vessels to replace these Liberties and the arrival of the *Wyoming* marks complete restoration of the French Line's position in this trade, serving Pacific Coast importers and exporters with fast modern tonnage.

According to Robert Lampietti, Pacific Coast Representative of the French Line, the arrival of the *Wyoming* on July 23rd coincides with the arrival of the rebuilt and completely modernized transatlantic liner *Ile de France* in New York on July 27th. Both of these arrivals mark a new day for the French Line after four years of rebuilding and reconstruction occasioned by the devastation of war.

Standing high out of the water at San Francisco, the new Johnson cargo-liner "Wyoming" awaits its load of fresh, frozen and canned fruit, and lumber from the Pacific Coast for European distribution.

Tests and Delivery of "Frank G. White"

By MORRIS GURALNICK*

THE new tugboat *Frank G. White* was delivered to the Board of State Harbor Commissioners of the Port of San Francisco on June 20. In the March issue of the Pacific Marine Review, the construction and unique launching of the craft were described. In this presentation, the trials and tests performed prior to delivery will be discussed.

Following preliminary completion of the tug, an inclining experiment was conducted to ascertain the metacentric height in loaded condition. At the time of the experiment, held late in the afternoon of May 27th during slack tide in the Alameda Estuary, the craft was in her fully loaded condition, with all tanks filled, ballast aboard, and only a few minor items of equipment remaining to be installed. A stage was constructed of timbers across the engine casing approximately at mid-length of the vessel. On it were placed two concrete weights of about 1100 pounds each, located on the longitudinal centerline. Two pendulums with plumb bobs dampened in buckets of oil were suspended at strategic locations. The inclinations resulting from the movement of the weights were recorded on wood battens placed across the rims of the buckets. Although the *White* is a small vessel, the method employed in the inclining experiment was quite similar to that for a large ship. The weights were moved individually outboard to both sides of the craft and finally back to the center while inclinations were recorded at each movement. Immediately upon recording the inclinations, tagents of the angle were plotted against the inclining movements. When the experiment was concluded, a straight line was drawn through or close to the plotted points indicated that all recordings were accurately made and that an accurate result of the test could be expected. Subsequent calculation of the displacement and GM indicated a metacentric height of 2.83 feet from which it may be concluded that the craft is stable. Trials under way corroborated this. During maneuvering trials, when the rudder was thrown hard over at full speed, the list away from center of the turning corcle amounted to only a few degrees. A copy of the data sheet showing figures accumulated during the test is included for reference.

*Guralnick and Biesemeier, Naval Architects and Marine Surveyors, San Francisco.

The "Frank G. White" zipping under the San Francisco-Oakland bridge.

The *White* was subjected to an extensive builder's trial over several days. At the dock with moorings securely attached, preliminary trials of the main and auxiliary engines were performed. Because of the large sized propeller which was designed to deliver 475 horsepower when running free, only about 290 R.P.M. could be obtained at the dock. This condition is common for tugs and later trials running free developed full R.P.M. Dock trials demonstrated remarkably smooth operation of the Enterprise main and Hercules auxiliary engines.

Trials at sea were actually conducted in San Francisco Bay and, to an extent, resembled the paces through which much larger vessels are put. Once clear of the Estuary, the craft was run one hour each at speeds of 25, 50, and 75 percent of full rated power. Observations of temperatures and other operating characteristics were made. The tug was then brought up to 100% power and a four hour run was undertaken on a straight course which stretched practically from one end of the Bay to the other. At this speed on a measured course, the craft logged almost exactly 12 knots, a creditable showing inasmuch as she was loaded several inches below her normal draft at the time. Percentage of power developed was determined from the fuel rack setting which was interpreted by means of a curve furnished by the manufacturer.

Subsequent to the full power trial, the *White* was run for one hour at 110% rating and for a shorter period at full power astern.

Having successfully completed these runs, the craft returned to the builder's yard for further adjustments. On another fair day, the *White* was sailed out of the Esturary for maneuvering trials and torsiographing. When running free at full speed, the rudder was turned by power steering gear to the hard right position and having completed a full circle, to the hard left position. The diameter of the turning circle was estimated to be

Aft end of State Harbor Commission's new tug, "Frank G. White," for use in San Francisco Bay, showing Type TASF Markey towing winch. Its 10 HP Radial air motor is well suited to the air-reversing diesel power plant of the vessel.

At least some of the credit for the trial results goes to the Enterprise 475 HP 8 cylinder diesel engine pictured here.

less than 100 yards. Similar turning tests were made running astern at about half speed.

On straight courses, with speed varying by 5 R.P.M. from dead slow to full, torsiograph recordings were made of the main machinery at three points of its length. The results indicate no torsional critical speeds throughout the operating range. As noted earlier, the rotating masses were originally designed to avoid criticals and the results corroborated the calculations.

Further tests were made of all the piping systems and other gear aboard. All tests proved the equipment to be operating correctly and as specified.

The day after delivery, the *Frank G. White* was given a performance test by her new owners. When set to the task of moving a dredge for a specified distance, she accomplished the job in half the time required by previous craft.

Coast Guard Examinations For Merchant Marine Officers

The United States Coast Guard announces that the next examination for licensed officers of the Merchant Marine for permanent commissions in the Coast Guard will be held on September 12, 13, and 14, 1949.

Applications should be postmarked prior to August 15 to insure processing for this examination. Commissions will be offered in the ranks of Lieutenant (junior-grade), Lieutenant and Lieutenant Commander, depending upon age, experience and professional ability. All applicants must be between the ages of 21 and 40, and have served at least four years aboard a U. S. Merchant vessel in the capacity of a licensed officer.

The examination is open to both licensed deck and licensed engineer officers of the U. S. Merchant Marine. Appropriate examinations will be given to each group. Application forms may be secured by writing to the Commandant of the United States Coast Guard, (PTP) 1300 E Street, N.W., Washington 25, D. C.

The examinations will be held in the following cities: Boston, Chicago, Cleveland, Honolulu, Ketchikan, Long Beach, Miami, New Orleans, New York, Norfolk, San Francisco, San Juan (Puerto Rico), St. Louis, Seattle, and Washington, D. C.

Applicants should indicate the city where they desire to report for the examination.

The commissioning of licensed officers of the Merchant Marine in the United States Coast Guard is part of the Coast Guard's Merchant Marine safety program. It is expected that the officers commissioned will be assigned to this duty. However, all officers commissioned from the Merchant Marine will receive a thorough indoctrination in regular Coast Guard duty including service aboard a major cutter.

Officers commissioned under this program are accepted on a two year probationary term which will coincide with their training and indoctrination period.

Johnson Line's motor ship "Los Angeles," sistership of the "Seattle" and "Golden Gate," which preceded her on the Europe to Pacific Coast run.

M. S. "Los Angeles" Of Johnson Line

THE Johnson Line's fleet of fine cargo-passenger ships has been augmented by the 9,100-ton M.S. *Los Angeles,* now in service between the West Coast of the U. S. and Europe. She is 502 feet long, 64 feet beam, and 27 feet draft.

The ship is the third in a series of five identical vessels ordered by the Johnson Line from the Swedish shipyards Kockus Med at Malmo. The first, the M.S. *Seattle* was commissioned first, and the second, the *Golden Gate* followed a few months later. They will vastly augment the fast, direct service between Europe and the North Pacific seaboard which the Johnson Line, under the direction of Consul General Axel Ax:son Johnson, has operated for more than thirty years.

During her trial run in Swedish waters the *Los Angeles* turned up an average speed of 22.6 knots, making her the world's fastest cargo vessel. Like her sister ships she is rated at 19.5 knots with full load.

Cargo Handling Cranes

The cargo handling equipment of the *Los Angeles* and her sister ships is also unique. The ships have fourteen specially constructed electric cranes, each with a reach of 41 feet and a capacity of from two to five tons. Instead of the usual five holds, the new Johnson vessels have seven, permitting a larger number of cargo-handling gangs to work at one time and thus materially reducing time spent in port.

Each ship has 95,000 cubic feet of refrigeration space of the latest type, of which one-third is available for deep freeze cargo. The vessels are propelled by two double acting Kockum Man Diesel engines with an output of 14,000 IHP.

Beautiful Passenger Appointments

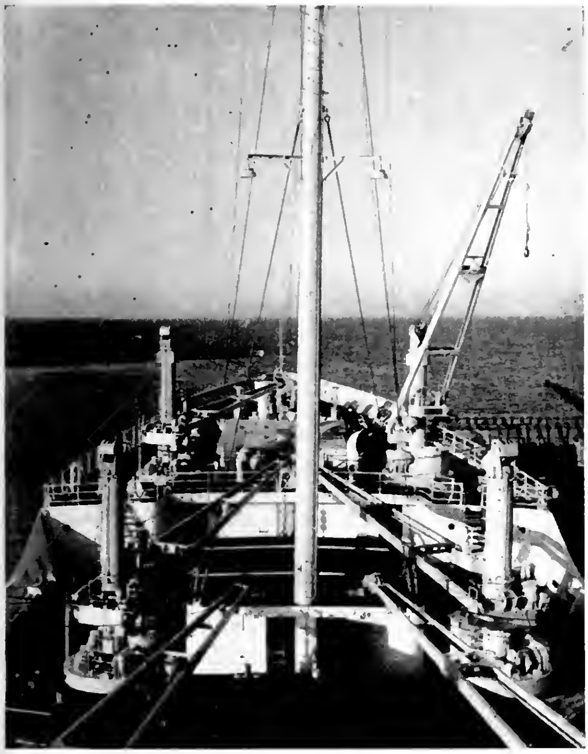
Although designed basically as cargo ships, each of the new vessels includes accommodations for twelve pas-

sengers in spacious outside cabins, each with private bath. Besides an owner's double cabin with sitting room there are four single and three double cabins, as well as a passengers' dining room, smooking salon and lounge. The passenger quarters are beautifully appointed and panelled throughout with Swedish maple, mahogany, American walnut and other fine woods.

European ports of call for these vessels include Stockholm, Malmo, Gothenberg, Hamburg, London and Antwerp. Visits are also made to Curacao, Barranquilla, the Panama Canal and Pacific Coast ports of Central America en route to the United States.

The Propellers

The *Los Angeles* differs from the other two vessels of the series in that she is equipped with KaMeWa propellers which have adjustable blades. They are 17 feet in diameter, of stainless steel. Stopping or backing is done direct from the bridge without having to stop or reverse the engines. With the engines running continually, the speed can be regulated and even stopped. The propellers are the largest adjustable propellers in the world. The previous record was held by the 8000-ton Johnson liner *Suceia* which also had KaMeWa equipment.

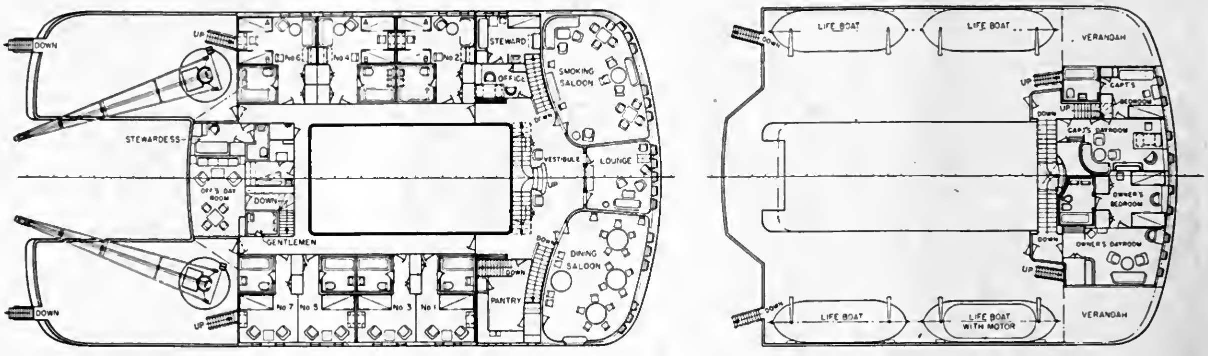


These cranes take the place of the booms and masts popularly associated with cargo handling and they offer a degree of flexibility and speed so essential to a quick turnaround in port.

For adjusting the pitch of the screw there is a lever connected mechanically to the operating gear on the propeller shaft. By the simple movement of this lever the propeller blades can be set for any required pitch between full ahead and full astern. For going ahead, the handle is moved forward from the neutral position and, for going astern, it is moved backwards. Thus, mistakes are most unlikely to be made. Every position of the handle corresponds to a certain pitch of the screw and it cannot be moved faster than the propeller blades will turn. Thus, one can check on the bridge that everything is functioning correctly, which arrangement gives the captain the confident feeling that he has full control of the machinery and of the ship. Adjustment of the pro-

Consul General Axel Ax:son Johnson
Owner of the Johnson Line

Fred L. Doelker
Pacific Coast Manager, Johnson Line



PROMENADE DECK **BOAT DECK**

Promenade and boat deck plans of the "Los Angeles."

peller from full-speed ahead to full-speed astern is effected in 5 to 15 seconds, depending on the size of the propeller. However, one can stop in the shortest time by pausing several seconds at the propeller setting—5°—and then slowly going to full astern.

For controlling the engine the equipment includes a tachometer, push buttons for adjusting the speed, a switch for emergency stopping of the engine, and a push button for signalling to the engine room.

The speed altering device is used: if the vessel is required to proceed at slow speed for a considerable time, because it is then more economical to run the engine at a lower speed; when extra speed is required, the propeller pitch then being reduced so that the engine revolutions can be increased above normal; in this way more power is developed by the engine without overloading; for adjusting the speed to avoid vibration. If the distance between the bridge and the engine is small, the speed altering device can be a purely mechanical arrangement of hand wheel, sprockets with chains, etc.

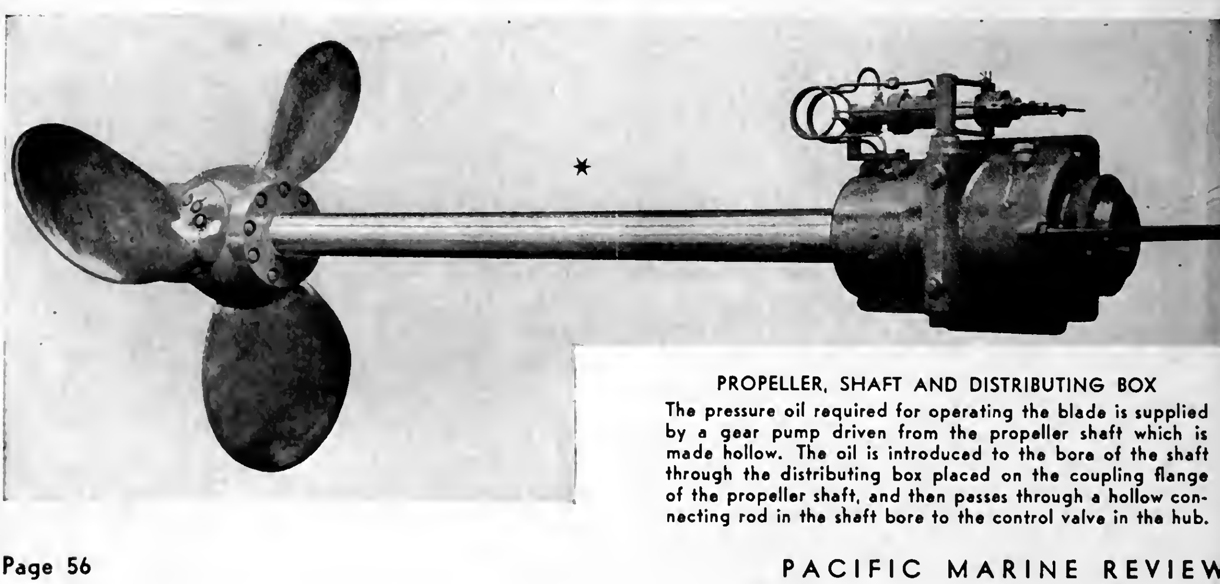
The switch is used when the engine is to be stopped at the end of the voyage or if there is a risk that a wire, towline, etc. may foul the propeller.

The push button for signalling enables the order to be given to start the engine—or, alternatively, the propeller can be controlled by the engine room staff in response to telegraph signals in the normal way.

It is worth noting that for the first time Lloyd's have consented to a reduction of the size of air starting tanks otherwise required. This concession was made possible thanks to the KaMeWa equipment.

The ship's equipment includes instruments indicating the momentary rate of fuel consumption as well as the torque effect on both port and starboard propeller shafts, number of revolutions and distance covered. These readings can be done both in the chart and engine room. In this manner all essential factors relative to the operation of the vessel are instantly ascertained.

The *Los Angeles* carries on the naming pattern established by the Johnson Line by its new five ship fleet, which uses names related to the great ports of the Pacific Coast, Two sisterships, now in service, are the *Seattle* and *Golden Gate* respectively, and two more ships will complete the group.



PROPELLER, SHAFT AND DISTRIBUTING BOX

The pressure oil required for operating the blade is supplied by a gear pump driven from the propeller shaft which is made hollow. The oil is introduced to the bore of the shaft through the distributing box placed on the coupling flange of the propeller shaft, and then passes through a hollow connecting rod in the shaft bore to the control valve in the hub.

Operation and Maintenance Factors For Marine Turbines and Gears

(Continued from July issue)

By R. J. BROWN

Assistant Turbine Engineer

General Electric Co., San Francisco, California

EDITOR'S NOTE: The following is the second part of the digest of the paper presented by Mr. Brown at the May 31, 1949, meeting, Northern California Section, Society of Naval Architects and Marine Engineers. The first part appeared in the July issue.

Cleaning Turbine Steam Path Parts

The cleaning of turbine steam parts on marine turbines can be a troublesome and costly job. Basically it involves the proper cleaning of the stationary parts as casings, diaphragms, nozzles, and labyrinth packing, and the rotating parts as rotor buckets, wheels, and packing fits. Generally too the time available to do the job will be very limited.

Where steam has been clean, no continuous leakage of steam into the unit has occurred, and proper drying out of the turbine on shutdown has been practiced, the internal steam path parts will generally not be very dirty. Hand cleaning by wire brushing and emery cloth polishing, followed by blowing out with air will generally suffice. Labyrinth packings may be stuck in their slots and, if so, can usually be freed with penetrating oil.

If boilers have been salted and priming has resulted, the internal parts may be cleaned of the water soluble deposits by washing.

Washing of turbines without lifting the casing with wet steam obtained by the spraying of condensate into the inlet steam has been practiced successfully on land turbine installations, but because of the special precautions needed and the set up required, it has not been adapted to marine practice.

Filling of the casing with hot water and turning the rotor over slowly will clean the rotor and lower halves of the diaphragm of water soluble deposits, but will not effectively clean the upper halves of the diaphragm. However, this method may be used for emergency cleaning of salted up turbines. Obviously, if this involves the filling of the condenser, this latter must be adequately supported. For a thorough cleaning, though, the casing will have to be lifted and the parts washed down with hot water and wet steam.

Control valves stuck from a salting up should always be removed and stems and bushings or packings be cleaned and polished.

Where continued service with contaminated steam has taken place and the interior of the turbine has been badly dirtied or where heavy corrosion has taken place, the casing must be opened for proper cleaning of the turbine. While broad surfaces as casings, diaphragm discs, rotor wheel discs, and packing fits may be cleaned by hand scraping and polishing, it may be impossible to effectively clean the bucket and diaphragm nozzle sections by hand. In this case, cleaning has been by fine grit blast or by chemical removal.

Because of the confined space of the engine room, grit blast cleaning must be done outside with consequent removal of the turbine rotor. By using fine grit blast (either wet or dry has been used) a very good cleaning of rotors and diaphragms is attained.

Chemical cleaning may be done outside the engine room and in some instances inside the engine room. When performed in place the upper half turbine casing is turned over and filled with cleaning solution. The lower half casing exhaust opening is blocked and the casing is then filled with solution and the rotor revolved slowly. Utilizing properly inhibited cleaning agents and following up with neutralizing agents and water washing, chemical cleaning has been advantageously accomplished. It should, however, always be done under the supervision of one familiar with chemical cleaning and with the turbine structure.

Following all major cleaning operations of a turbine rotor its balance should be checked before returning it to service.

Bearing Wear and Maintenance

Bearing wear and bearing replacement have already been touched upon, but a few additional comments may be of value. Ordinarily the bearings of turbines and gears under continued good operating conditions can be expected to have but little wear. Where wear has occurred it can usually be traced to one of the following causes: loss of oil, dirt or other foreign particles in oil, excessive vibration of the rotor, undue loading of the bearing caused by misalignment of the rotor, improper assembly of the bearing, or loss of cooling water to the bearing oil cooler.

Where bearing wear has taken place, the criterion for replacement of the bearing should be first the condition of the babbitt and second the bearing clearance

(Please turn to page 102)

Cycloidal Propulsion

By HARRY S. WILSON

Naval Architect, Marine Section, Transportation Corps Board

CYCLOIDAL propulsion development, which has engaged the engineers of the Transportation Corps in experimental work for the last five years, has been perfected to the extent that tests prove conclusively vessels equipped with cycloidal propellers have a decided advantage over vessels equipped with other type propellers, when quick maneuverability is of prime importance. Cycloidal propulsion eliminates the need of rudders, shaft tube, skeg, and conventional steering mechanism which are required when using screw propulsion; as a result, there is an unimpeded flow of water to and from the propeller. This principle of propulsion is particularly valuable when applied to floating cranes, tow boats, self-propelled lighters, mineplanters, ferries and tugboats.

Cycloidal propulsion is not entirely a wartime, or postwar development in marine engineering, though the Transportation Corps became interested in it only in 1944. The first recorded experiments with cycloidal propellers were conducted by Professor F. A. Kirsten of the University of Washington and W. E. Boeing of Seattle, Washington, 30 or more years ago, but these efforts availed little at that time, due to the lack of interest by the marine industry of this country. Professor Kirsten's experiments were recorded in his article "A New Type Propeller" in the January 1928 issue of Journal of the Society of Automotive Engineers. However, the German engineers were interested, and they made much progress in continuing the study, using the same basic principle originated by Kirsten and Boeing, and developing new steering and control mechanisms.

The Research and Development Division of the Transportation Corps took up the study where the German engineers left off, in 1944. They realized its possibilities while deducing that much development work would yet be required, mainly in the simplification of mechanical linkages and the application of mass production methods to this equipment. For instance, in the development of marine work boats, for which the Army Transportation Corps is responsible, a variable pitch propeller is most advantageous; on a workboat, the propeller load is constantly varying and it is necessary to reduce the pitch of

Editor's Note: See articles on Cycloidal Propulsion in PACIFIC MARINE REVIEW for May and June, 1946.

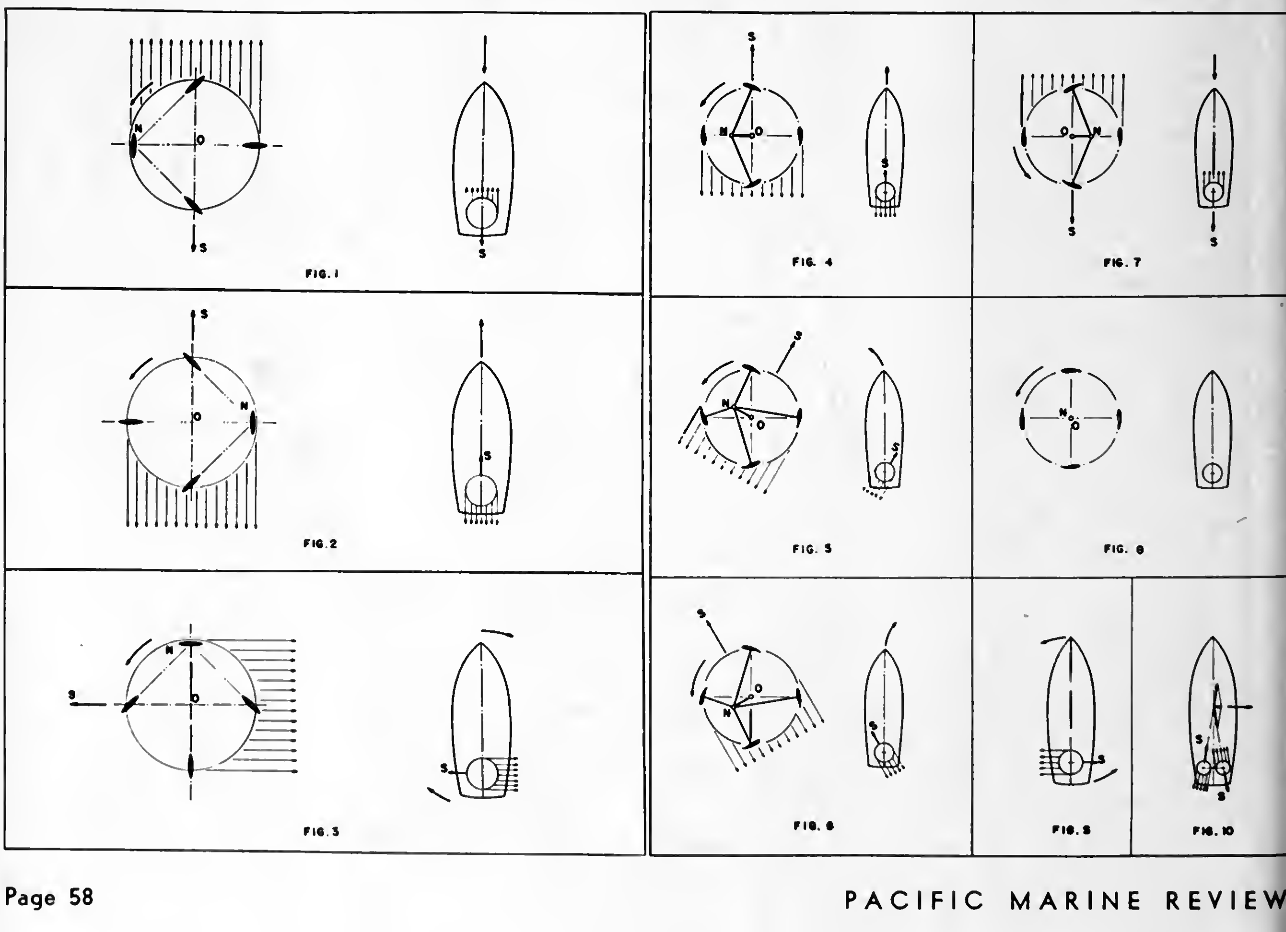


FIG. 1 FIG. 2 FIG. 3 FIG. 4 FIG. 5 FIG. 6 FIG. 7 FIG. 8 FIG. 9 FIG. 10

the propeller to obtain optimum performance when towing and in like manner increase the pitch when running free.

The Cycloidal Propeller

The Cycloidal propeller consists of a rotating disc set in an opening in the hull bottom and flush with the bottom. About the periphery of this disc, four to eight

Figure 1A. Voith Schneider propeller showing housing, blades and linkage to one blade.

vertical blades are set perpendicular to the disc. These blades perform on oscillating or sculling motion about their longitudinal axis as the disc is rotated. (Fig. 1-A)

Kirsten-Boeing Design

The distinguishing feature of the Kirsten-Boeing propeller is the position of the steering center N which is located on the blade orbit and results in fixed pitch. The action of the propeller blades is shown in figures 1, 2, and 3.

Fig. 1. Steering center N set to produce astern motion of the vessel.

Fig. 2. Steering center N set to produce ahead motion of the vessel.

Fig. 3. Steering center N set to produce starboard turning of the vessel.

The Kirsten-Boeing propeller required a varying engine or shaft speed to meet load requirements.

Voith-Schneider Design

The German or Voith-Schneider propeller has the steering center N located within the blade orbit. The distance of the steering center N from the center of rotation O can be varied as shown in figures 4, 5, 6, 7, 8, and 9. This variation results in a variable pitch which can be adjusted to meet load requirements.

Fig. 4. Steering center N set to produce ahead motion of the vessel.

Fig. 5. Steering center N set to produce port turning motion of the vessel.

Fig. 6. Steering center N set to produce starboard turning motion of the vessel.

Fig. 7. Steering center N set to produce astern motion of the vessel.

Fig. 8. Steering center N set so the blades are feathered and no motion is produced.

Fig. 9. Steering center N set to produce a spinning motion of the vessel to port.

Fig. 10. Thrust of the two propellers set to produce a sideways or crabbing motion of the vessel to starboard.

Transportation Corps Developments

The Transportation Corps has made extensive study of the German design. This study revealed that the manuverability of a vessel equipped with cycloidal propulsion is better than any other known type of propulsion. The Transportation Corps placed a contract with Pacific Car and Foundry Company, Renton, Washington, to build two variable pitch propellers, 3′ in diameter with six blades each, to be installed in an Army 46′ Wooden MTL (motor tow launch MTL-951) powered by a standard Chrysler Royal eight-cylinder, 115-horsepower gasoline engine. These propellers were to be designed by the contractor with the aid of Professor Kirsten. It was necessary to modify the aft portion of the hull of the MTL to a relatively flat section (fig. 11) to provide proper flow of water to the propellers. The need for this modification was indicated by the experience of the Germans in the development of cycloidal propulsion. The final design of the propellers for this craft incorporates the following features: The two propellers (fig. 12) are located on either side of the centerline in the aft portion of the hull and are driven by a single shaft from the engine through a right angle gear box placed between the two propellers on the vessel centerline. Two steering wheels (fig. 13) which have an interlocking device to be

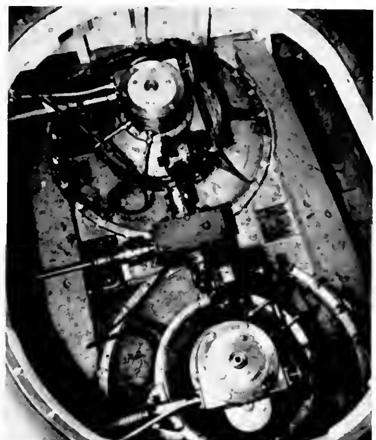


Figure 12. Twin Cycloidal propeller installation.

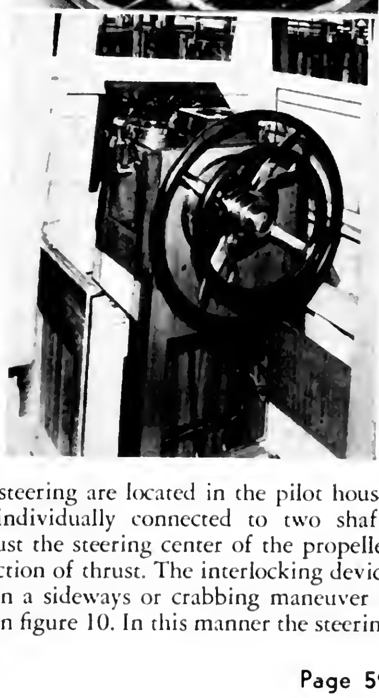


Figure 13. Pilot house control stand for Cycloidal propellers.

used for ordinary steering are located in the pilot house. The wheels are individually connected to two shafts which in turn adjust the steering center of the propeller to the desired direction of thrust. The interlocking device is disengaged when a sideways or crabbing maneuver is desired, as shown in figure 10. In this manner the steering

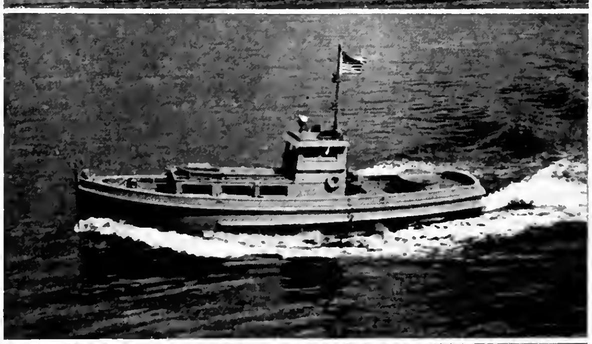
From top to bottom:

Fig. 11. Port side view showing modification of aft portion of hull.

Fig. 12-A. Demonstrating cycloidal propulsion of small craft (Puget Sound, near Everett, Washington, June, 1946).

Fig. 14. Executing spinning maneuver.

Fig. 15. Demonstrating zig-zag maneuver.



angle of each propeller may be coadjusted to produce a component thrust in a sideways direction. The pitch of the blades is set by means of a pilot house control to an electric motor mounted on each propeller.

The vessel modification and propeller installation were completed in early 1946. Figure 12A shows the completed boat.

The MTL-951 was put through trial towing, dead pull tests, speed trials, crash stops and maneuverability tests in July of 1946 at Everett, Washington.

Results of these tests proved very favorable and the extreme maeuverability provided by cycloidal propulsion was fully proven. Maneuvers accomplished included sharp right angle turns; consecutive zig-zag turns both ahead and astern; spinning (figure 14); and crabbing or sideways maneuver with and without a barge.

During the period of development and testing of propellers for MTL-951, the Transportation Corps was developing certain design changes with a view toward simplification at some sacrifice of efficiency. From this study, the preliminary design for a simplified mechanism which could be mass produced was evolved. The motion of the propeller blades produced by this mechanism is known as sinusoidal motion.

In June 1946, a contract was negotiated with the same West Coast firm for the final design, construction and installation of one simplified cycloidal propeller in a 40′ pusher type steel towboat MTL-2336, powered by a Chrysler Royal eight-cylinder 115-horsepower engine. The contractor was required to build the boat from TC design drawings, and provisions were made for further changes in design of the propeller as the development progressed.

The final development of the propeller produced an operating linkage for sinusoidal blade motion and also for simplified cycloidal motion. The installation of the propeller with the mechanism for sinusoidal blade motion was completed in the latter part of 1947. The propeller weight was reduced 33 per cent over the propellers of the MTL-951, but at some loss in operating efficiency. The propeller is capable of mass production and can be maintained by semi-skilled mechanics. Extensive tests similar to those performed on the MTL-951 were conducted in March 1948 on the MTL-2336.

The same inherent maneuverability characteristics (fig. 15) of cycloidal propulsion were apparent and it was found that there was very little loss in thrust operating in shallow water as compared with deep water.

The mechanism for simplified cycloidal motion was completed and installed in the MTL-2336 in June 1948, at which time the vessel was again tested. It was found, although this mechanism is somewhat more complicated than the sinusoidal motion, that some increase in efficiency over the sinusoidal motion was obtained and the weight factor, capability of mass production, and maintenance factor were retained.

Currently the Transportation Corps Board is evaluating the possibilities of the sinusoidal motion and the simplified cycloidal motion as developed for the MTL-2336.

During the summer of 1949, it is intended to conduct extensive tests on an MTL with the conventional

(Please turn to page 105)

Isn't This Interesting?

The questions directed to this publication from time to time relate to many subjects, as diversified as the bell on a ship to world geography and trade. Often they are answered in our "Skipper" or "Chief" or "World Trade" sections, but others just accumulate and will be covered in occasional general information pages such as this one. Have you any questions?

Did you ever hear of a donkey's breakfast as a maritime term? Or a prayer book? Or a spit kid? See below.

"Down the hatch" is a misapplication of terms. The hatch is the opening in the deck. The heavy sections that close it form the "hatch cover". The vertical space to the hold is the "hatch way".

A sheet is not a sail, but a rope used to control a sail. This leads to the phrase "by and large", used by many a non-mariner. With the sheets well eased off, a ship sails "large". With sheets close-hauled, a ship sails "by" the wind. "By and large" means the full range between close-hauled (within 4 points on a fore-and-aft rigged vessel) and sailing free.

A "sailor's blessing" is a curse!

Which way are the blades turned on a propeller? Generally, single propellers are right handed; twin screws turn outward (river steamers turn inward to reduce water disturbance); triple screws have the wing propellers turned outward and the center screw right handed; quadruple screws have the starboard wheels right handed and port screws left handed. (Right handed means clockwise and left handed means counter-clockwise, when viewed from behind the ship facing the propeller.)

The "pulpit" is the harpooning platform on the bow-sprit of a sword fishing vessel.

Sea water weighs 64 lbs. to a cubic foot with 35 cu. ft to a ton, while fresh water weighs 62½ and river water about 63 lbs.

"Trust in Gods" are very light, lofty sails.

A "purse seine" is a large net floated vertically by floats and towed around a school of fish by boats. When school is surrounded the bottom is drawn up around it and drawn together or "pursed". Then the seine is hoisted and the fish spilled on deck. The boat is a seiner or purse seiner.

A "tot" is a drink of rum.

Ever hear of a windfall? In early England no oak trees could be cut except for the Navy. But if the trees blew or fell down they were exempted and were called windfalls.

A Portuguese man-of-war is a kind of jelly-fish surmounted by a fluted ridge which catches the wind and acts as a sail.

You can travel from the Atlantic to the Pacific for $2.40.*

A "turn" has many meanings aboard ship. Men *turn in* at night and *turn out* in the morning. *Turn turtle* is to capsize. The tide *turns*. A *turn ahead* or astern means to move the propeller over a few times. To *take a turn* is to wind a rope around a bitt. *Turn to* is to commence work. *Turn around* is the time between a vessel's arrival and departure.—And there are others.

Prayer books are small holystones or sandstone bricks used for cleaning decks.

A spit kid is a cuspidor.

A donkey's breakfast is a straw mattress.

* At Panama.

Galvanized Welds

Here is a simple, effective and thoroughly practical method for assembling galvanized members by welding and getting the same protection on the weld area as on the base metal. It works on new assemblies made up of galvanized sheets, plates, casting and rolled or forged shapes. And it works just as well on galvanized assemblies that are repaired or reworked by welding. It can be used to patch a galvanized surface that has lost its protection through localized over-heating, abrasion or other causes. In fact, it *is* galvanizing, but it is galvanizing restricted to localized areas without the trouble of hot dipping large or complicated assemblies.

Known as "Galv-Weld," the process was developed before the war and used extensively by the Navy and Maritime Services for shipbuilding and repair. Galv-Weld is a stick of low melting zinc base alloy that quickly and easily re-galvanizes structures and sheets from which the galvanizing has been burned off during the welding process. The material is merely rubbed over the heated surface and melts to leave an adherent coating of zinc alloy. It is made under the patents of Galv-Weld, Inc.

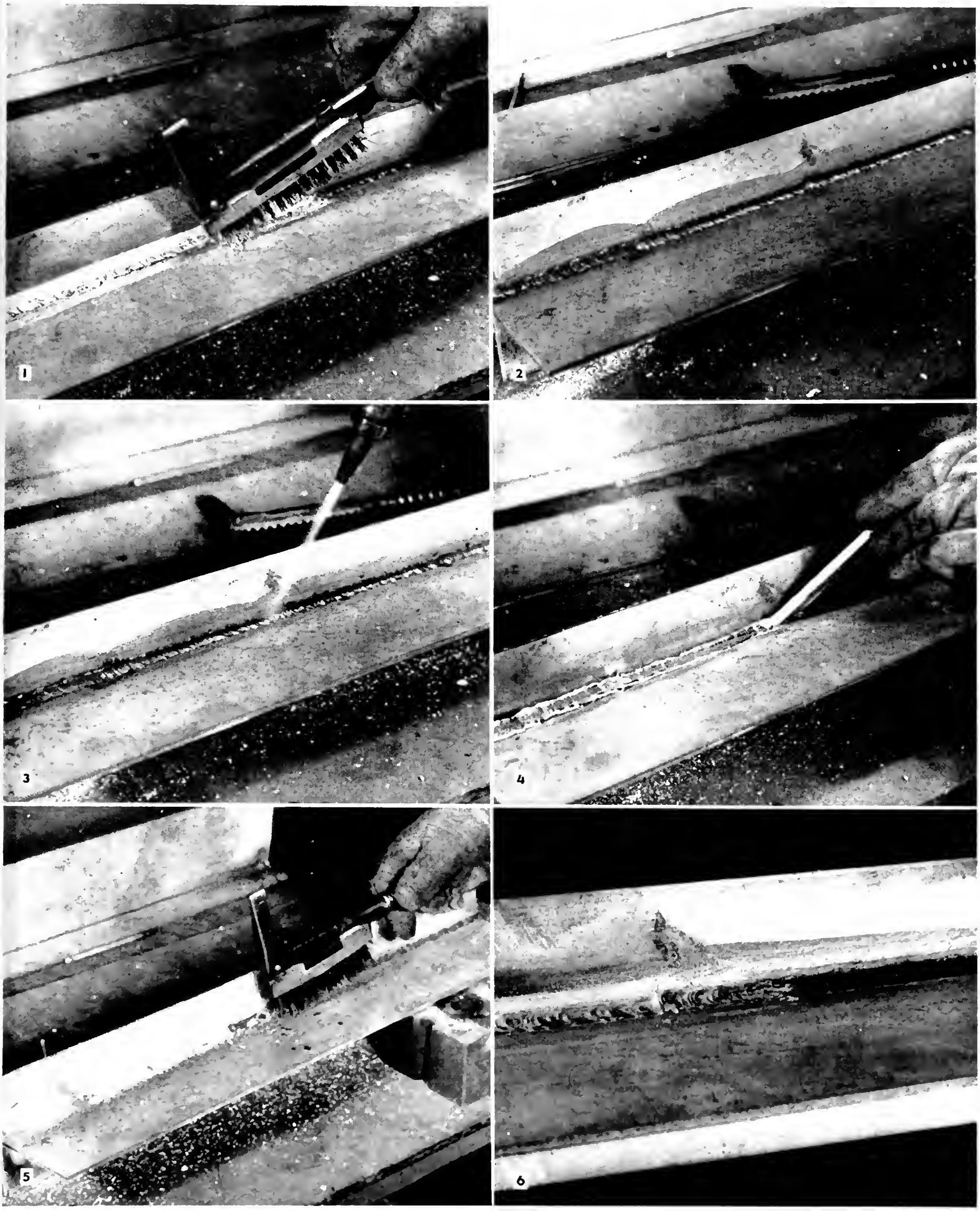
According to the exclusive distributor, United States Steel Supply Company, the process requires no flux, needs no sandblasting, makes no fumes, won't peel or chip and makes a bond to the base metal that is actually superior to zinc metal spray. No special equipment is necessary, and the work can be done anywhere in any position and in confined quaters. Galv-Weld joints, made on production work prior to the war, have resisted exposure in salt air mist for more than 11 years without failure. And it has successfully withstood an official Government 141-day salt water test—nearly 17 times that required of commercial hot dip galvanizing.

Two galvanized strips being welded together to form a tee bar.

All that is necessary is a few seconds' warming of the work with a welder's torch. If the work has just been welded with uncoated rod, the process is applied while the weld is still hot. Soiled or corroded surfaces and welded areas made with coated welding rod must first be brushed up with a wire brush to eliminate surface oxides. Then the area is re-heated to approximately 600°F. In repairing skips and blemishes on hot-dip or electro-galvanized surfaces, the work must be similarly heated to 600°F in the immediate area to be coated. Actually the Galv-Weld melts at 450°F, but the surface should be hotter in order to get a good flow and to insure proper spreading and bonding of the melted alloy.

Besides eliminating much of the trouble with re-dipping galvanized assemblies at the end of the production line, this process can be applied to simplify and improve design in many cases. Often engineers have gone out of their way to call for assembly with galvanized bolts and nuts or other galvanized fasteners when the product would more logically be a welded assembly but for the difficulty or even the impossibility of re-galvanizing. In so doing, they have opened the way for corrosion to start by requiring lapped seams that can be joined by fasteners. With Galv-Weld available, such assemblies can be fabricated of galvanized components and then welded, thus providing real savings in manufacturing cost, weight of finished product and improved appearance. Such assemblies are in many cases stronger as well. The Galv-Weld is then applied to the weld area only, while assembly work continues on other parts of the structure.

Manufacturers of galvanized products and those fabricating first from black iron and then hot dipping can now turn out products that sell better because they cost less and last longer. The time, expense and inconvenience of hot dip galvanizing after assembly can be eliminated as skips and damaged surfaces are quickly and easily re-galvanized by this new method.



(1) Welding spatter is immediately brushed away. This also removes surface oxides. (2) The unprotected weld as it appears when completed. (3) The weld is now reheated. (4) Galv-Weld is rubbed over the heated weld to form a new coating which has all the appearances of the original plus the corrosion resisting properties and wearing qualities of zinc. (5) Re-galvanized surface is brushed to smooth it out while Galv-Weld remains in liquid state. (6) The welded joint, showing the area that has been re-galvanized with Galv-Weld.

Anniversary of a Great Service

Vice Admiral Joseph F. Farley, USCG, Commandant, United States Coast Guard with headquarters at Washington, D. C.

On August 4th the U. S. Coast Guard passed its 159th year. Founded by Alexander Hamilton in 1790, it has established a great record in every war; but its peacetime functions are too little known. In war it is part of the Navy; in peace it comes under the Treasury Department and enforces Customs laws, Navigation laws, Immigration laws, Quarantine laws, Anchorage laws, Marine Inspection laws, and laws relating to smuggling, fisheries, seals, safety at sea, neutrality, oil pollution, yachts, commercial vessels, and the patrol of regattas. These are classed as law enforcement duties.

But the Coast Guard has many dramatic functions that are not considered law enforcement. These include assistance to vessels in distress, maintaining and developing radio beacons and loran stations, light ships, light houses (and 40,000 other aids to navigation), the removal of derelicts and floating objects, life saving service, the ice patrol in the Atlantic which was established after the *Titanic* sinking in 1912 (it is noted that not a single life has been lost in this connection since the patrol was established), flood relief, and many others. More than 5,000 persons have been rescued from danger during the past year, and property valued at $160,000,000 has been saved or protected.

This proud service is headed by Admiral Joseph F. Farley, Commandant. His far-flung range includes the famed Coast Guard Academy at New London, Conn.; 23,000 officers and men, and 300 vessels, large and small. In some parts of the world they administer the law as well as enforce it, and for any peacetime maritime emergency they are *semper paratus,* always ready.

Wartime

The war record of the Coast Guard's service with the Navy is one of glory, but transition to a war footing comes naturally to a Service that is in a sense always at war—for its emergent operations in time of peace against flood, ice, and storm at seas are the best possible training for naval warfare.

Coast Guard cutters were used extensively for convoy and antisubmarine patrols. Coast Guardsmen trained in rescue operations in small boats are well qualified to man landing craft of all kinds. As World War II progressed, the Service was able to take over the manning of numbers of destroyer escorts, frigates, and small patrol craft. The *Icarus, Campbell,* and *Spencer* became famous as subbusters. Coast Guard-manned transports and landing boats figured prominently in assault landings on Guadalcanal, North Africa, Sicily, Salerno, the Aleutians, Kwajalein, Tarawa, Noemfoor, Normandy, Saipan, Leyte, Luzon, Iwo Jima, Okinawa, and other invasions.

The Coast Guard's duties were not confined to transporting men and materials to enemy shores. No sooner had the first waves established a foothold on the beaches than Coast Guardsmen landed and assisted in handling invasion traffic, directing the coming and going of barges loaded with fresh troops, with casualties, tanks, trucks, jeeps, guns, bulldozers, munitions, food, and all the paraphernalia and manpower needed to establish a successful beachhead.

In addition to the Coast Guard's own craft—cutters, tenders, icebreakers, fireboats—the Service took over hundreds of ships for the Army and Navy. Thousands of Coast Guardsmen operated transports, moving troops and supplies to the battle zone, bringing back prisoners of war and our own wounded on return trips.

One Congressional Medal of Honor, 6 Navy Crosses, 2 Distinguished Service Medals, 63 Silver Star Medals, 93 Legions of Merit, 8 Distinguished Flying Crosses, 177 Navy and Marine Corps Medals, 203 Bronze Star Medals, 194 Air Medals, together with numerous Com-

(Please turn to page 67)

Coast Guard Always Busy

OPPOSITE.

Top: Coast Guard Cutter "Unimak" passing under Golden Gate Bridge, San Francisco.

Center: When the motors of this PBY drone in the sky over a Loran station, it's music; it means mail—fresh fruit—candy—cigarettes—and even fresh eggs. Hence, it is often called the "Flying Valet"—service plus!

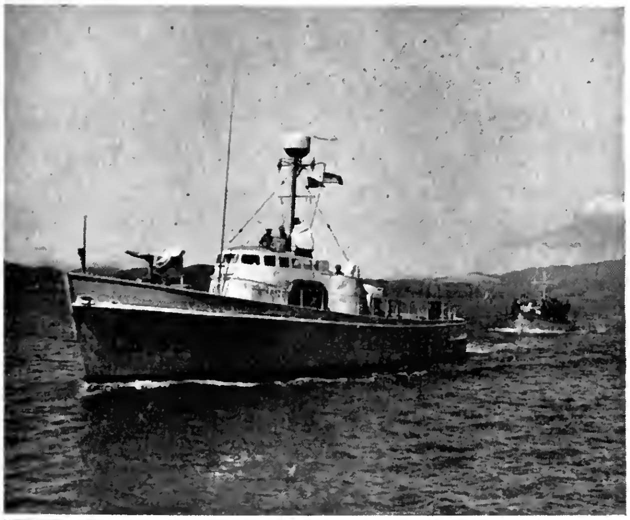
Bottom: Coast Guard PBM search and rescue plane making JATO (Jet Assist Takeoff) in San Francisco Bay during recent demonstration. Alcatraz Island in background.

BELOW:

Top: The airborne lifeboat slung under the bomb bay of of this converted B-17 Flying Fortress is carried to the point of emergency, then released, and with the aid of parachutes, floats down to within reach of survivors at sea.

Bottom: This Coast Guard plane dwarfs the camera (lower right) yet this 9-lens wonder camera of the Coast and Geodetic Survey, the only one of its kind in the world, is valued at $100,000. The plane was about $200,000. The plane, a converted B-17, Flying Fortress of World War II fame, has been especially modified for map-making and carries the wonder camera on map-making flights for 8 to 10 months of each year.

Coast Guard Always Ready



OPPOSITE.

Top: Coast Guard 83-ft. patrol boat towing disabled fishing boat in San Francisco Bay.

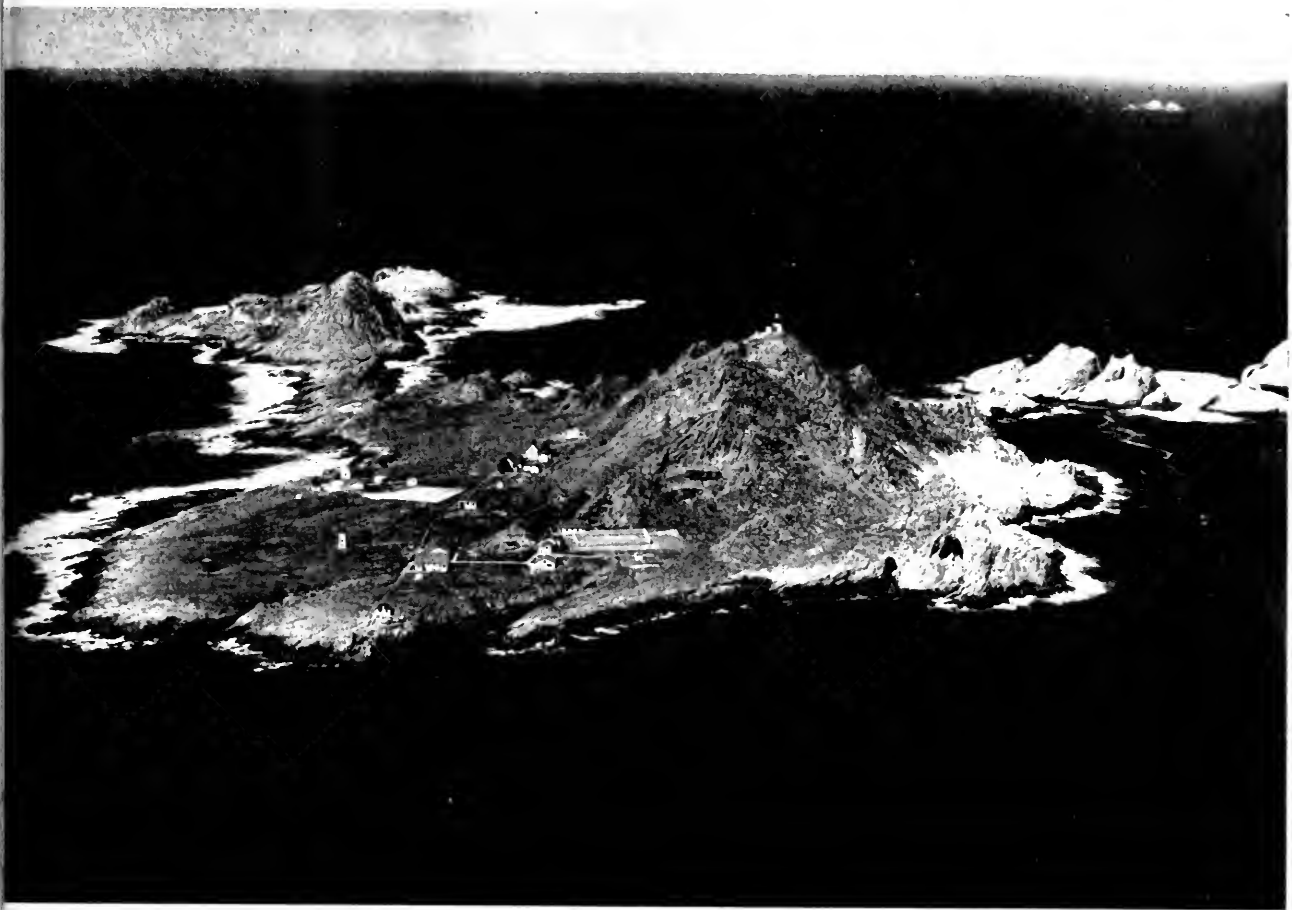
Center: The C G C "Ironwood," one of the vessels constantly servicing the Coast Guard's aids to navigation such as channel markers, bell buoys and lighthouses.

Bottom: Small boat being hoisted by derrick at Coast Guard light station on Farallon Island. This is only means of landing on the Island.

BELOW.

Top: Breeches buoy rescue being performed in the manner for which the Coast Guard is so famous.

Bottom: Small Coast Guard patrol boat cleaning harbor of debris.



U. S. Coast Guard lighthouse and direction finder station, Farallon Island off San Francisco. Station is visited once weekly by tender carrying supplies and equipment as well as mail.

Coast Guard

(Continued from page 64)

mendation Ribbons and Unit Citations, were awarded Coast Guardsmen during World War II.

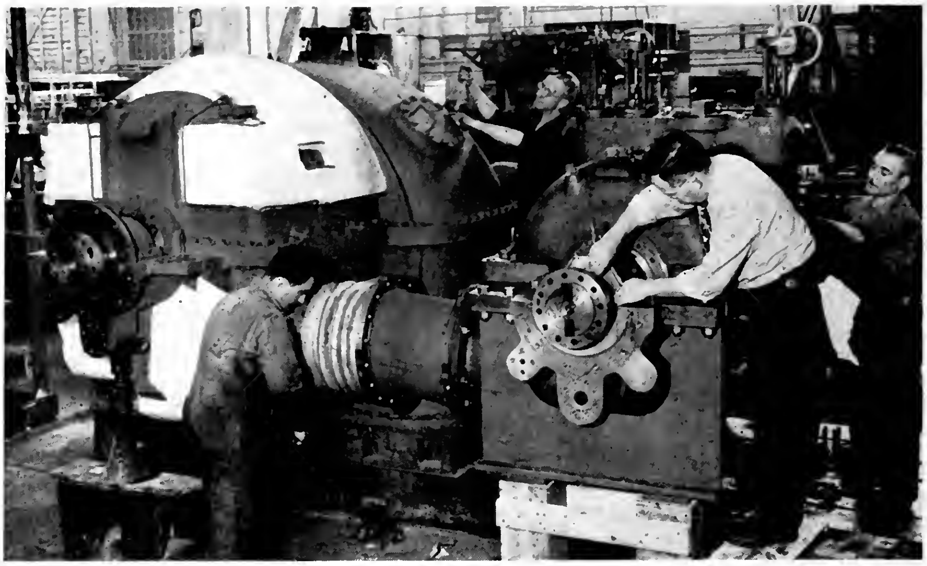
Rear Adm. Stika

Rear Admiral Joseph Edward Stika, Commander, Western Area, U. S. Coast Guard, and District Commander, Twelfth Coast Guard District, with headquarters at San Francisco, was born in 1889 in Milwaukee, and commissioned an Ensign in 1911 at the Coast Guard Academy.

After serving as Purchasing Officer, Coast Guard Store, New York, and as Ordnance Officer at Coast Guard Headquarters, he became in 1937 executive officer of the Coast Guard Academy, where he remained until June 1940 when he became commanding officer of the *Bibb*, which was on Atlantic Weather Patrol. Assignments thereafter included: From 1941 to 1943, Commanding Officer, Alameda Base, Purchasing Officer, Pacific Coast, and Superintendent, Merchant Marine Training Station, Government Island, Alameda, Calif.; Commanding Officer of the Coast Guard Training Station at Alameda; District Port Security Officer, Fifth Naval District, Captain of the Port, Norfolk, Va., and Assistant District Coast Guard Officer at Norfolk.

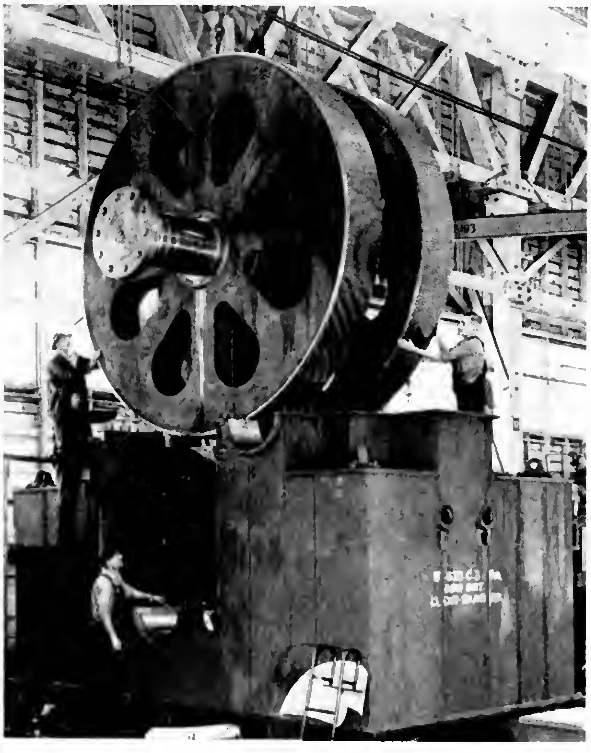
Advanced to Commodore in 1945, and Rear Admiral in 1948, he was assigned as District Commander, 13th Coast Guard District, on July 8, 1946, until March 22, 1949, when he assumed his present duties. As Lieutenant Commander during World War I he was awarded the Navy Cross.

Rear Admiral Joseph E. Stika, USCG, Commander, 12th Coast Guard District and Commander, Western Area, U. S. Coast Guard, with headquarters at San Francisco.



MARINE TURBINE, SHOWN IN A FINAL PRODUCTION STAGE AT THE SUNNYVALE PLANT OF WESTINGHOUSE.
In the foreground, at left, Peter T. Yerkovitch is tightening up bolts on the expansion joint of the big pipe which conveys steam from the high-pressure cylinder to the low-pressure one. In the foreground, at right, Bert Simmons is using a gauge to check clearances on a bearing of the high-pressure cylinder. In the background, left to right, J. L. Archibald and Charles Pecoraro are tightening bolts on the cylinder housings. The white covering on the large cylinder is asbestos, which holds the heat. When the turbine is installed in the engine room of the "Wilfred Sykes" the cylinders will be completely wrapped in asbestos.

The Power Plant For The "Wilfred Sykes"



Marine Propulsion Unit

The *Wilfred Sykes'* propulsion unit was built at the Sunnyvale, Cal. plant of Westinghouse Electric Corporation and includes the turbine and gear case. It was installed by the American Shipbuilding Company, Lorain, Ohio, for the Inland Steel Corporation.

Of a modified C-3 type, the turbine has been specially adapted for the customer's requirements. It is in two parts, consisting of high-pressure and low-pressure chambers, which together generate 7,000 horsepower. Compact in size and taking up a minimum of engine room space,

THE BULL GEAR AS IT NEARED COMPLETION

The 25-ton marine bull gear, the construction of which we have been reporting for several months, being lowered into its gear case during a final production stage at the Sunnyvale, Calif., plant of Westinghouse.

The double-wheel gear is the final reduction stage in a train of gears which reduces the 6,000 revolutions per minute of a 7,000 horsepower turbine to a propeller shaft speed of 100 R.P.M. For all its size and rugged construction, the gear is designed and built to very minute and precise standards. The 693 teeth on each wheel were hobbed to tolerances as fine as .0003 inch, to insure vibrationless, trouble-free operation. The wheel is so delicately balanced that it can easily be turned by hand when it is installed in its king-sized gear case. The gear case, complete with the bull gear, high speed reduction gears and pinions, weights over 60 tons. It is part of a complete modified C-3 marine propulsion unit on the *Wilfred Sykes.*

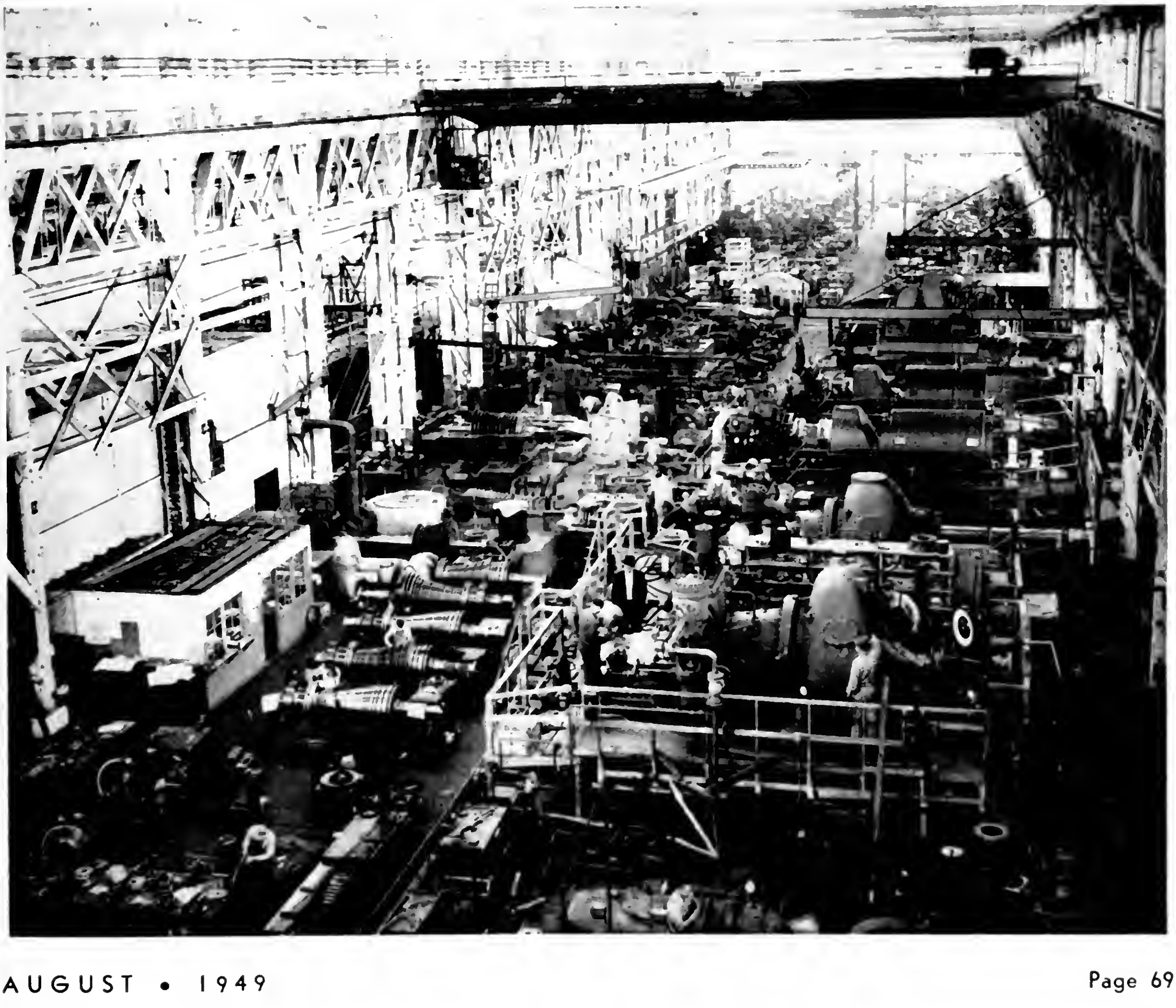
the turbine gains its power from the high speeds at which the spindles turn. The high-pressure spindle turns at approximately 6,000 revolutions per minute, while nearly 4,500 RPM is the speed of the low-pressure spindle during normal operation. Both spindles, however, can turn safely at 20 per cent more than those rated speeds.

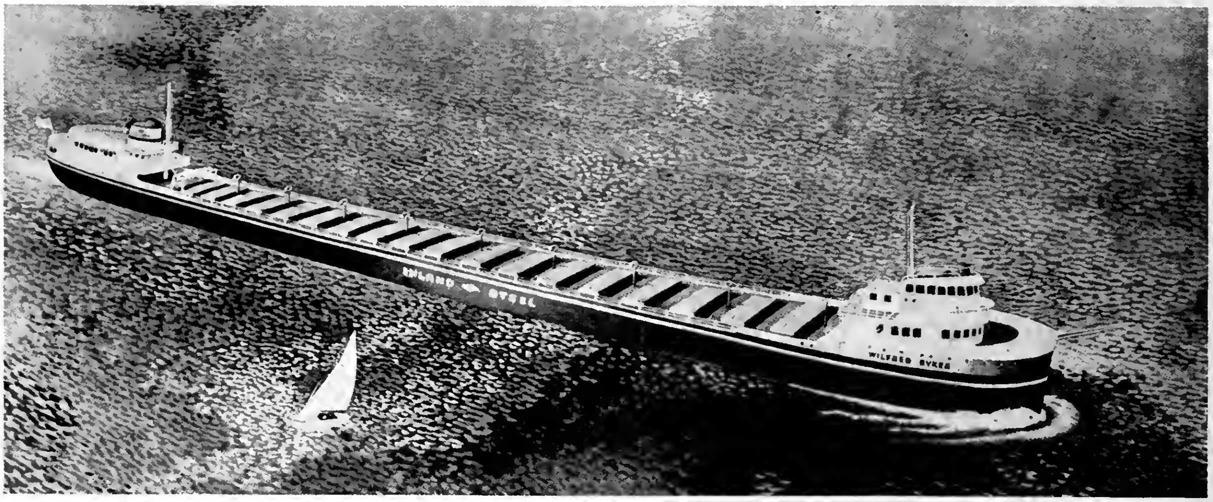
Built to extremely close machining tolerance—as small as .001 inch—the turbine unit contains approximately 7,000 stainless steel blades in 58 rows. Each row of blades has a special contour to take maximum advantage of the force of the steam which flows through the housing. At the inlet end of the high-pressure turbine, steam enters at 440 pounds pressure per square inch. After it has passed along the various rows of the smaller high-pressure turbine, in a fraction of a second, the steam enters the low-pressure chamber with a head of 35 pounds. By the time the steam has swept through the low-pressure chamber, its pressure has actually been reduced to less than that of the outside atmosphere.

The high speed of the turbine is reduced to the approximately 100 RPM required for the propeller shaft by a train of massive gears. Both turbine spindles are

THE "WILFRED SYKES" TURBINE SEEN AMONG OTHERS AT THE WESTINGHOUSE SHOP

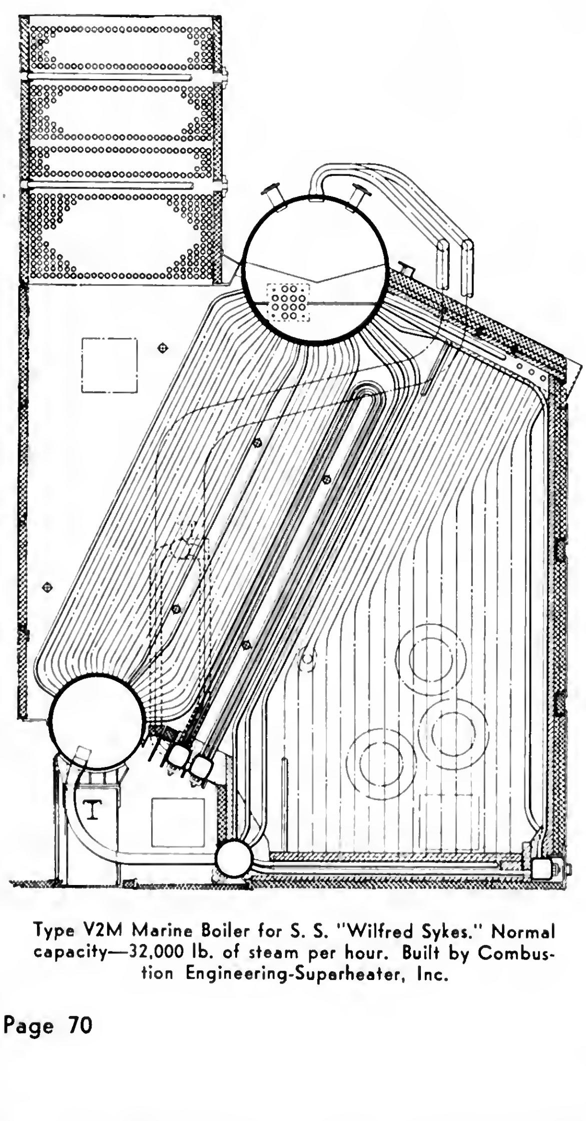
More than 140,000 horsepower is represented in the 12 turbines which can be seen in various stages of construction in this picture, taken at the Sunnyvale, Calif., plant of Westinghouse Electric Corporation. This view of the turbine bay in the plant's Building 41 shows (right) four nearly-completed units on test staging. Nearest the camera is a 12,500 kilowatt turbine—believed the first of its size ever built in the West—receiving its final running test just before shipment to the Tucson Gas, Electric Light and Power Company, where it will turn a generator providing electricity for Southern Arizona homes, stores, industries and farms. Next in line is an 11,500 KW turbine which is receiving final adjustments prior to test; it is for a Texas utility company. Third in line is a 5,000 KW 60-cycle turbine-driven "packaged power" unit, complete with all apparatus including generator and condensers. Beyond it is another 5,000 KW "packaged unit" of similar type, designed for 50-cycle service. These two units are for use by utilities in Latin America. On the floor of the bay, and visible at the left of the nearest test stand, are five similar spindles which are destined for 12,500 and 11,500 KW turbines. Beyond them are four other turbines, for power generation and marine propulsion. One of these is already in its cylinder ready for final test. Dwarfed by the big turbines, and not visible in this picture, are three smaller turbines with a total additional horsepower of approximately 4300. *Westinghouse Photo*





The "Wilfred Sykes" is the largest ore carrier ever built on the Great Lakes.

coupled to gear pinions which drive the high-speed reduction and "bull" gears. The gear case, which, with its gears, weighs approximately 60 tons, is mounted in the engine room directly aft of the turbine.



Type V2M Marine Boiler for S. S. "Wilfred Sykes." Normal capacity—32,000 lb. of steam per hour. Built by Combustion Engineering-Superheater, Inc.

C-E Boilers

Steam for the geared turbines on the *Wilfred Sykes* which develop 7000 shaft horsepower will be generated by two Combustion Engineering Type V2M marine boilers. These units each have a normal capacity of 32,000 lb. of steam per hour and an overload rating of 48,000 lb. per hr., making them the largest boilers in point of capacity yet applied to a cargo vessel in regular Great Lakes service.

The boilers are designed for 525 psig and operate at a superheater outlet pressure of 450 psig and a steam temperature of 750 F. Each steam drum is equipped with a surface type desuperheater which is capable of desuperheating 8,000 lb. of steam per hour to 50 deg. F. superheat.

Among the features incorporated in these modern boilers are the following:

1. Extended screen tubes, with separate inlet header, to provide protection for water drum without the necessity of refractory protection on the gas side of the drum.

2. Vertical superheater elements, which permit thorough cleaning by conventional soot blowers and provide less opportunity for deposit of products of combustion.

3. Flexible connections to and from superheater headers.

Firing of the boilers is by means of three steam atomizing oil burners designed to burn No. 6 fuel oil. The sides, roof and rear of the furnace are water cooled, with an inclined tube bank. Each boiler has a two-pass horizontal tubular air heater. The front and rear of the boilers are double cased, with the wind box at the front and air space at the rear. Air is furnished by motor-driven forced-draft blowers.

Shipbuilding in Japanese Yards

— Seagoing Vessels Classified by American Bureau of Shipping —

Builder	Type—Size	Power	Owner	Tons
Harima Shipbuilding Works Aioi.	Cargo Vessel 377'4"x53'6"x29'6" Launched 3-25-49	Turbine 2300 H. P.	Sanko S.S. Co., Ltd. Osaka, Japan	4,950 Gross tons 6,500 D.W. tons
Same.	Cargo Vessel 400'3"x57'9"x34'9" Keel Laid 3-5-49	Turbine 3600 H. P.	Sanko Kisen Kaisha	6,000 Gross tons 7,600 D.W. tons
Hitachi Shipbldg. Co. Innoshima.	Cargo Vessel 400'x57'x35'5" Keel Laid 2-24-49	Turbine 3600 H. P.	The Nissan S.S. Co. (The Sempaku Kodan)	6,200 Gross tons 8,200 D.W. tons
Hitachi Shipbldg. Co. Sakurajima.	Cargo Vessel 354'3"x49'3"x26'3" Keel Laid 3-15-49	Turbine 2400 H. P.	Shofuku Kisen Co. Tokyo, Japan	3,700 Gross tons 5,250 D.W. tons
Kawasaki Heavy Industries, Ltd., Kobe.	Cargo Vessel 367'x52'6"x29'6" Launched 3-31-49	Turbine 2400 H. P.	The United Ocean Transport Co., Ltd. (Daido Kaiun Kabushiki Kaisha)	4,550 Gross tons 6,500 D.W. tons
Same	Oil Tanker 501'10"x65'7"x37'9" Keel Laid 12-18-44	Turbine 6,000 H. P.	— —	10,000 Gross tons 14,500 D.W. tons
Mitsubishi Heavy Industries Yokohama Shipyard & Engine Works, Yokohama.	Cargo Vessel 341'2"x51'6"x26'3"	Turbine 2400 H. P.	Sempaku-Kodan & Nitto Shosen Co.	3,690 Gross tons 5,400 D.W. tons
Mitsubishi Heavy Industries Hiroshima Shipyard & Engine Works, Hiroshima.	Cargo Vessel 337'11"x50'6"x27'3½" Keel Laid 2-21-49	Turbine 2400 H. P.	Mitsubishi Kisen Co. Tokyo, Japan	3,700 Gross tons 5,250 D.W. tons
Mitsubishi Heavy Industries Kobe Shipyard & Engine Works, Kobe.	Cargo Vessel 404'5"x57'5"x36' Keel Laid 2-16-49	Turbine 3600 H. P.	Sempaku-Kodan & Osaka Shosen Kaisha	6,150 Gross tons 8,300 D.W. tons
Mitsubishi Heavy Industries Nagasaki Shipyard & Engine Works, Nagasaki.	Cargo Vessel 374'x53'1½"x29'6" Launched 4-16-49	Turbine 2400 H. P.	The First Shipping Co., Ltd., Kobe, Japan	4,825 Gross tons 6,500 D.W. tons
Same	3 Cargo Vessels 465'x64'3"x41' Hull 1410—Keel Laid 4-19-49	Diesel-Tw. Sc. 10,660 H. P.	National Development Co. The De La Rama S.S. Co. Manila, P.I.	10,000 Gross tons ——
Mitsui S. B. & Engr. Co. Tamano, Japan	Cargo Vessel 344'6"x50'10½"x26'3" Keel Laid 3-23-49	Turbine 2400 H. P.	Sempaku Kodan & Kansai S.S. Co.	3,700 Gross tons 5,250 D.W. tons
The Nippon Steel Tube Co., Tsurumi Shipyard Yokohama, Japan	Cargo Vessel 400'3"x57'5"x35'5" Keel Laid 11-19-48	Turbine 3200 H. P.	Kyoritsu S.S. Co., Ltd. Tokyo, Japan	6,000 Gross tons 8,200 D.W. tons
			TOTAL	93,465

There are additional vessels classified by Lloyd's but whose names have not been reported to us. These vessels increase the total under construction in Japan to 116,000 tons on June 30, 1949. This is a reduction from 144,000 tons on March 31, due to either completion or cancellation.

Pacific WORLD TRADE

Reg. U. S. Pat. Off.

Restoration of Trade With Japan

UNDER the general secretaryship of Alvin C. Eichholz, Manager, World Trade Department, San Francisco Chamber of Commerce, a conference for the study of restoration of private trade with Japan was held in San Francisco May 26 as a feature of World Trade Week. It was organized by the World Trade Week Committee, the Chamber of Commerce, the Retail Merchants Association, the Far East-America Council for Trade & Industry, the National Retail Dry Goods Association, and the World Trade Association.

Addresses were made by Dr. Sherwood M. Fine of SCAP; Dennis McEvoy, President of American Chamber of Commerce of Japan; H. Royce Greenwood of Union Oil Company; Lawrence M. Dickson of American Import Company; W. J. Gilstrap of Wells Fargo Bank & Union Trust Company; and T. L. Elliott of American President Lines.

A general discussion panel brought out many informative answers, some of which are quoted here. The panel:

W. A. Ashman, Atkins-Kroll & Company; John Barthrop, United States Lines; Dr. Claude A. Buss, Stanford University, Consulting Editor, *Far East Trader;* Tom B. Coughran, Bank of America; Gordon Dakins, National Retail Dry Goods Association; Brooks Darlington, Far East America Council for Commerce and Industry, Inc.; L. M. Dickson, American Import Company; T. L. Elliott, American President Lines.

W. J. Gilstrap, Wells Fargo Bank & Union Trust Company; H. Royce Greatwood, Japan Oil Storage Company, Union Oil Co.; Dhan Mukerji, Pan American World Airways; Howard Hutchins, Bank of California; Prof. Mathew G. Krivor, Consulting Engineer, UNRRA and ECA; Arthur P. Lazarus, Getz Bros. & Co.; J. J. Lermen, Tidewater Associated Oil Co.; A. D. Levis, Secretary-Treasurer, Connell Brothers.

Ray McConnell, Retail Merchants Association; Dennis McEvoy, American Chamber of Commerce in Japan; R. A. McLaren, Pacific Transport Lines, Inc.; Wm. L. Montgomery, Montgomery of San Francisco; Charles G. Nichols, National Retail Dry Goods Association; Harry Scott, General Steamship Corporation; R. N. Senesac, Frazar & Hansen Ltd.; Karl M. Stull, Retail Dry Goods Association of San Francisco; John Wagner, Pacific Far East Line.

To emphasize the main points of Dr. Fine's excellent presentation he began on a note of warning, drew attention to the fact that the complexities of the social, economic, and political problems facing the Far East "add up to a tremendous challenge and threat to world peace and stability. . . . Virtually all of the conditions which prompt gravitation to the extreme Left exist to an appalling degree throughout the Far East." This is the peripheral environment of the Occupation of Japan—an Occupation whose "major outstanding problem" is still "that of achieving an economy capable of self-support for a nation of eighty-one million persons, confined to an area smaller than the State of California of which only some sixteen per cent is fit for cultivation."

Dr. Fine explained that the heavy costs of the Occupation to the American taxpayer led to the Draper Mission in the spring of 1948. The report of this Mission "urged the development of a vigorous rehabilitation and recovery program sparked by a renewal of procurement of essential raw materials to get the wheels of Japanese industry and foreign trade rolling once again in high gear."

Economic recovery in Japan "would in turn afford significant stimulus to the economic revival" of Japan's Asiatic neighbors. "It is not difficult," Dr. Fine declared, "to envisage under propitious circumstances a level of trade and commerce many fold larger than that experienced in recent years. Perhaps no more effective barrier to Communist advances could be erected than that formed by a flourishing commerce raising living standards and affording some optimism in the progressive improvement of the general welfare." This concept, he said, "has been one of the dominant themes in SCAP's approach to the longer run pattern of the Japanese economy."

Dr. Fine emphasized that "Japan remains the pre-

dominant industrial nation of the Far East capable of supplying the largest share of the manufactured products required by Asia." In spite of difficulties in importing raw materials, the index, based on 1930-1934 levels as 100, reached the figure 69 for March 1949. The index target for December 1949 is 85.

Japan's exports for the year 1948 reached $277 million and for 1949 will approximate $525 million. This has been achieved, Dr. Fine explained, "without the assistance of any sizeable direct rehabilitation appropriations from the United States . . . and in spite of deficiencies of hard currency and much needed raw materials in Southeast Asia" and other traditional Japanese trading areas.

Japan is now trading with 108 nations or territorial areas. In 1948 the United States supplied some 440 million dollars of exports (about two-thirds of Japan's total imports); in this same period Japanese exports to the United States amount to some 66 million dollars (about one-quarter of all Japanese exports). Dr. Fine warned that "with respect to the immediate period ahead failure to secure 'Most Favored Nation Treatment' for Japanese products will seriously prejudice her trade prospects." "Japan can be pauperized," he said, "by discriminatory tariff barriers."

Since August 1947 when Japan was first opened to limited private trade, successive steps have been taken to expand the scope of that trade, encourage the tourist industry, and facilitate foreign business activity in Japan. In January of this year limited foreign investment in Japanese industry was authorized. In April a single exchange rate of 360 yen to 1 dollar was adopted. This was followed by the opening of the major stock exchanges and, most recently, by the termination of reparations removals. These and other factors have contributed to a leveling off of the inflationary spiral, but Dr. Fine warned that Japanese efforts at achieving economic revival "are doomed in the absence of a considerable amelioration of the prevailing ills plaguing Japan's neighbors."

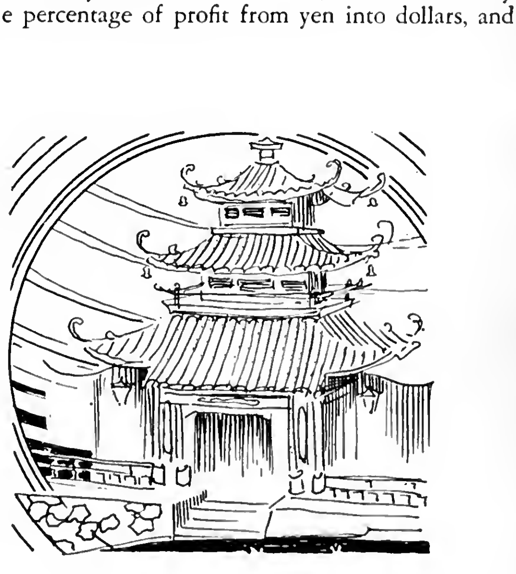
In conclusion Dr. Fine emphasized the economic, political, and security stake of the United States in Japan. A healthy, flourishing trade between the two countries "can only be erected upon the basis of increased American purchases of Japanese products. Under General MacArthur's leadership," he said, "the U. S. need no longer be apprehensive of dumping or irresponsible cutthroat competition. Japan is now and will continue to be a 'fair competitor' . . . and an assured friend of this nation." Finally, he indicated that "governmental procedures are constantly subjected to review and revision to facilitate export trade and foreign investment. There is the fullest appreciation that Japan's destiny and long run welfare must be founded on the earliest resumption of normal business procedures and practices." SCAP, he declared, continues to count on the San Francisco Chamber of Commerce "for its friendly and sincere cooperation and advice."

Dr. Fine was followed by Dennis McEvoy, President of the American Chamber of Commerce of Japan, Tokyo, and Tokyo Representative of *The Reader's Digest.* Mr. McEvoy listed internal stabilization, promotion of trade, and the influx of American capital as the means of shoring up Japan's economy and restoring her economic prosperity. Mr. McEvoy stated flatly that all current problems affecting trade restoration "either have been solved or are definitely in the process of solution." "I have yet to walk into General MacArthur's office," he said, "with a recommendation endorsed by our Chamber as fair and practical and not receive an instantaneous decision if the matter was in his power to decide. Too often . . . General MacArthur has been blamed for policies and activities imposed upon him by Washington authorities. The American businessman has no greater friend than MacArthur." The majority of us, Mr. McEvoy declared, "cannot go along . . . with some of our fellow businessmen who have returned to America to revile MacArthur and the Occupation because they were either disappointed in some particular deal or chose to fight the existing red-tape rather than work with and through it."

Mr. McEvoy said he could not agree that a "great spiritual revolution" has taken place in Japan. Such a revolution, however, might be "in the making" and "with peace and the opportunity to achieve a stable, prosperous economy, Japan may well emerge as a great asset to the United States in the vicious contest between the forces of freedom and those of slavery in which we find ourselves engaged."

In the field of trade and commerce, the major objectives of the American Chamber of Commerce in Japan, Mr. McEvoy declared, "are to obtain further reductions in controls, to build good will for Japanese exports abroad, and to return as quickly as possible to the old commercial system and all that it implies. Another objective is to convince the Army that American businessmen are not graduates of San Quentin and that many of their restrictive regulations are annoying, insulting, and absurd." Fortunately, the Army is now planning a program "which will equalize conditions between the military and business community in many respects."

Among the problems affecting the investment of American capital are the present confiscatory nature of the Japanese taxation system, the claim courts, the seeking of a fair evaluation of prewar holdings as a necessary preliminary to added investment, the convertibility of some percentage of profit from yen into dollars, and



the repatriation of capital. In spite of this long list, Mr. McEvoy declared that "all of the problems of the prewar and postwar investors have either been solved or are in the works at this time."

In conclusion Mr. McEvoy announced that General MacArthur had requested him to say, on his behalf, that the Japanese peace treaty is "long, long overdue." Mr. McEvoy called upon his audience, the City of San Francisco, and the organizations represented at the Conference to "take the lead in bringing our policy formers in Washington back to a realization of the urgency and the necessity for decision in the Far East today." Drawing attention to the fact that "Russia is an Asiatic as well as a European power," Mr. McEvoy asserted that "the people of San Francisco, in the interests of our entire nation, can well carry the banners for a shift in emphasis from Europe to the Orient, and the placing of the conduct of our foreign affairs in the hands of able, practical graduates of the realistic school of Asiatic business and politics."

In the discussion period, Mr. McEvoy commented on the recently publicized resolution submitted to the Tokyo Chamber of Commerce by its sub-committee on investment. He said the report on which this resolution was based had been prepared some six months ago and was now quite outdated. When the resolution had come up before the Chamber originally he had tabled it because of its outdated character. Thus far he has been unable to determine whether the same report or a revised report has come up before the Chamber in his absence. The vote, 21 to 2 with 30 abstentions, would seem to indicate, he said, that it was the same old report and resolution. Mr. McEvoy went on to state that there were a number of laws of which the American business community did not approve. These include the labor standards law, the anti-Zaibatsu law, and the economic purges. SCAP, however, has meanwhile taken measures dealing with many of the issues opposed by the business community.

Mr. North, of S. F. Chamber, asked Dr. Fine if he knew anything about the *Nippon Times* editorial which purportedly hailed Communist victories in China as the death knell of American imperialism in the Far East. Dr. Fine replied that he had not seen the report but that it was impossible for him to conceive of any strong anti-American feeling on the part of responsible Japanese. "Only on the extreme Left," he said, "is there an anti-American feeling." He also declared there is "no need to fear a reversion to anti-Western, anti-American policy once we leave, for it is clear to the Japanese that their future can be secure only if they maintain a pro-American orientation."

In connection with this question, Dhan G. Mukerji of Pan American World Airways referred to a paper published by the Royal Institute of International Affairs in which the opportunistic side of the Japanese character had been discussed. He wondered if there was quite as much basis for optimism as Dr. Fine had seemed to indicate. In reply, Dr. Fine stated that self-interest would naturally determine the future course of Japanese policy, but that if we ensure Japan of a decent standard of living and maintain our friendly relations with people, we need not fear a triumph of Communism.

Arthur P. Lazarus of Getz Bros. & Co. asked what financing techniques SCAP would permit so as to enable exporters to retain at least some of their profits in dollars or pounds sterling. Dr. Fine replied that recommendations have gone forward to Washington envisaging a degree of retention sufficiently attractive to serve as inducement. He declared that he expected "a satisfactory solution soon."

W. A. Ashman of Atkins-Kroll & Company asked about the possibility of an exchange of goods on a barter basis between Japan and the soft currency countries so as to eliminate the drain on dollar exchange. Dr. Fine replied that in the case of soft currency countries the Trade Agreements Program had been aimed at a basic balance of goods for goods. Credit arrangements are provided only to take care of imbalance.

Mr. Thorlaksson, the Honorary Vice Consul of Iceland, referring to the Soviet move to insert the question of peace with Japan in the Paris agenda, asked what the effect upon the Japanese people would be of a Soviet-initiated treaty. He also asked if a real trade boom could take place before a treaty is signed. In answer to the first question, Mr. McEvoy reviewed briefly the efforts made by the United States since March 1947 to initiate discussions relative to peace with Japan. These efforts have been frustrated by the attitude and tactics of the Soviet Government. The Japanese people know this and also know that General MacArthur is most anxious to see a treaty concluded. In reply to the second question, Mr. McEvoy declared that full trade can be restored without a treaty but that a treaty would help solve certain existing problems perhaps more readily than would otherwise be the case.

Bruce Johnson, formerly with ESS, SCAP, next asked about the American policy with respect to the travel of Japanese traders abroad. Dr. Fine answered by saying that the United States permits Japanese traders to travel anywhere in the world subject only to the resrictions imposed by such nations as object to this policy of maximum freedom.

Brooks Darlington of the Far East-America Council for Commerce and Industry, Inc. asked about the prospects of ever getting Japan off the American taxpayer's back. Dr. Fine declared it might be possible for Japan to become independent of American aid by 1953. He admitted that such an estimate was based upon a host of variable factors and assumptions, but he felt it was not far-fetched to envisage a self-supporting Japan by 1953.

(Additional discussion of Japanese trade problems will be published here in the September issue.—*Ed.*)

Myers New President Of Junior Traders

The Junior World Trade Association of the San Francisco Chamber of Commerce has elected Edward A. Myers president. Myers has been associated with Otis, McAllister Company for the past three years. He was chairman of the Junior Traders' program and dance committee during World Trade Week.

Edward A. Myers

Other officers elected are: Bruce A. McClelland, Frazar and Hansen, Ltd., vice president; Robert H. Langner of the San Francisco Chamber of Commerce, secretary; and Thomas B. Shaw of the Bank of California, treasurer.

Directors elected are: J. Murray Fox, American President Lines; Jess J. France, Jr., U. S. Department of Commerce; Kenneth R. Hollingshead, Standard Oil Company of California; Richard L. Schinazi, Jr., Polak, Winters and Company; and Jack M. Weese of Funch, Edye and Company.

Philippines to Import Less

The Philippines are to import less.

Under executive order, issued by Philippine President Quirino and effective August 1, additional cuts in "non-essential" and luxury items will take effect.

This information was released through the San Francisco Chamber of Commerce based on information received from the Philippine Consulate General in San Francisco.

Base period used for quota allocations, likewise, is changed in the new order. Hereafter, import quotas will be based on yearly averages during 1946, 1947, and 1948.

License fees charged will also be increased.

Protest by American shippers has resulted in an extension of the application of the new order to textiles from August 1 to August 31.

Items added to the new non-essential list include common nails, Portland cement, rubber, vegetables in any form, and canned pineapple.

Cuts in the amount of goods on the luxury list which may be imported include beer, cigarettes and toilet soap.

The price limit on imported radios has also been lowered. This has been cut from 150 pesos to 100 pesos. However, the price limit on automobiles has been eliminated.

Under the new order imports on canned pineapple are reduced 90 per cent; vegetables, 40 per cent; cement, 90 per cent; and nails (common wire and finishing, one to five inches), 80 per cent.

Surridge Presented Foreign Trade Award

Clarence T. Surridge (right), Manager of American President Lines' Freight Department, was presented the 1949 award of the Western Management Association "For Outstanding Work in Foreign Trade," at a special surprise dinner in his honor at the Claremont Hotel, Berkeley, on July 19. Surridge, who, in point of service, is one of the oldest shipping executives in the Bay area, was presented the award by Gordon H. Williams (left), Vice President, Williams Equipment Co., Manila. The Association concluded a two-day conference in Berkeley on July 20 on methods of increasing foreign trade through West Coast ports.

Marine Insurance

Mine Losses and Mines Reported January 1 - June 30, 1949

Records kept by the American Cargo War Risk Reinsurance Exchange New York now indicate a total of 303 ships sunk or damaged by mines since the termination of hostilities in the various theatres of war. This figure includes 29 mine casualties which occurred in the six-month period since Dec. 31, 1948.

Among larger cargo vessels suffering casualties were the *Hornby Grange* off Bremerhaven on January 31st, the *Steel Admiral* near Saigon on January 23rd, the *William Homan* off the German Coast on February 27th, the *Souliotis* in the North Sea on March 4th, the *Scandia* off the Danish Coast on March 27th, the *Agioi Victores* off the Dutch Coast on April 8th, the *Indian Merchant* also off the Dutch Coast on April 21st, and the *Sardegna* near Dover on May 8th.

The latest mine casualty reported prior to July 1st was the *Myosotis,* a dredge operating in the Mekong River, mined on June 24th. On June 21st the Belgian passenger steamer *Princess Astrid* was sunk in Dunkirk Roads with a loss of 5 lives and all mail and freight.

In addition, it is suspected that several vessels reported missing may actually have been mine casualties. This theory has been advanced particularly in connection with the disappearance of several small vessels in the North Sea and approaches.

During the 26 week period under consideration mines have been reported at an average rate of more than 9 per week, for a total of 240. An increasing proportion of such reports comes from areas which were not mined during the war, and which must therefore be the result of wind and drift.

Eleven mines were reported in Western Hemisphere waters, and sixteen along the more important Atlantic trade routes.

One Collision Each Week Might Be Avoided

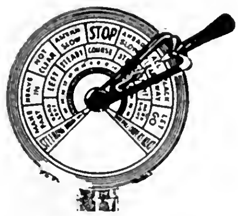
*London TIMES, Feb. 19.—Mr. E. Parker and Mr. L. S. Le Page, of the operational research group of the Ministry of Transport, said that it had been estimated that 45 British ships in 1947 and another 40 in 1948 had been involved in collisions which might have been prevented and in the same two years a further 50 and 45 strandings might have been averted had radar been fitted.

Of British vessels fitted with radar, one was involved in collision in 1947 and seven in 1948. The use of radar effected a considerable saving of time, and it was estimated that an increase in earning power of some £2 million a year could be achieved if the entire British merchant fleet was equipped with sets. The number of British merchant ships fitted with radar was given as 429; this included 45 per cent of all passenger liners and 44 per cent of all passenger and cargo liners.

*From: U. S. Naval Institute Proceedings—May 1949.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

Use of the Slide Rule by Deck Officers

WHEN I started the study of Navigation, one of the first "don'ts" was "Don't use a slide rule for navigation, but if you do, use it only as a check and that in the privacy of your own quarters".

Knowing nothing at that time of the use of a slide rule and only slightly more of navigation, the advice was accepted and for a number of years the slide rule was an infernal device which had no place on shipboard. This same opinion was shared by a large percentage of practicing navigators.

In all probability the reason for this attitude is that they have been warned away from its use for fear of raising "the old man's" ire to an all time high.

It is true, I'm sure, that the masters of some vessels would prefer that their mates did not use the slide rule. Perhaps these masters themselves have never become familiar with the use of it and as a result cannot put their faith and trust in a device they know nothing about. In such a case when the master refuses to have the accuracy of the slide rule proven in comparison with other accepted methods, the only alternative is of course to refrain from using it.

After avoiding the use of the slide rule for several years I finally tried it (behind a locked office door much as a kid out behind the garage or in the alley trying his first cigarette) and after some study and a comparison of the results found it to be equally as accurate as some of the other accepted methods and was sold on the idea of using it.

For this reason I feel justified in presenting this and perhaps another article on the use of the slide rule.

The average time required for the solution of most problems by slide rule as compared with logs or other tables is about one fourth. The accuracy of the slide rule compares very favorably with that of logs or other tables. As an example: a right triangle having a side of 18 ft. opposite an angle of 38°. The length of the hypotenuse is 29.233 ft. by logs, 29.3 by Table 3 and 29.25 by slide rule.

It might be pointed out that some of the aforementioned masters who prefer not to have the slide rule used on board their ship (because it is not accurate enough) will swear by the accuracy of Table 3; but I have not found a single instance where Table 3 proved to be more accurate than the slide rule.

The uses of the slide rule for the Deck Officer are many. To list a few we might suggest the following: Deck Seamanship formula, such as finding Breaking Stress and Safe Working Load of wire, rope, chain, etc.; of finding tension on the hauling part of a given purchase; the tension on topping lift; the thrust on a boom; or the size of line or wire required for a given weight; *Cargo* formula, *Stability* formula, *Fuel Conservation* formula, *Mensuration*, and *Navigational* formula.

The ease and speed with which plane triangles, either right or oblique, can be solved, makes the slide rule a must to the Deck Officer on watch when piloting, as far as I am concerned. For most navigational problems the A and S scales or the T and D scales are used. Using the A and S scales, what is known as the Law of Opposites is used. That is, with the slide set so that a given angle on the S scale is opposite the value of the length of the side opposite that angle on the A scale, the value of the length of the other sides of the triangle on A side will be opposite their respective angles on S scale.

As an example of the above statement, let us imagine a right triangle whose hypotenuse is 24 miles and which has a known angle of 30°. By setting 90° on the S scale in register with, or opposite, 24 miles on the A scale we can read 12 miles on the A scale in register with 30° on the S scale. By subtracting the sum of these two angles from 180° we get the value of the third angle, 60°. Reading opposite 60° on the S scale we find the value

(Please turn to page 108)

News Flashes

SALES TAX ON SHIP PARTS REPEALED IN CALIFORNIA

AB 3106 by Assemblyman Maloney of San Francisco has been signed by Governor Warren. This bill exempts from the California sales tax law any material purchased to become a part of ships and water craft used in interstate or foreign commerce or commercial deep sea fishing; also the purchase of such vessels.

* * * * *

ALEXANDER PLANS EAST COASTWISE SERVICE

H. F. Alexander and his associates are planning an East Coast operation similar to their projected San Francisco-Long Beach steamship service. This would be a five ship operation.

Two of these would run between New York and Providence, R.I., two between New York and Norfolk, Va., and the fifth would be a reserve vessel, if present plans materialize.

* * * * *

WORLD TRADE CENTER FUND APPROVED

San Francisco's mammoth world trade center moved a step nearer with the approval of use of $300,000 in State Harbor Commission funds for plans and specifications to accompany the application to the RFC, which is understood to be favorably disposed toward the entire plan.

* * * * *

COASTWISE TRADE REVIVING

Following the success of Chamberlin's C-Coaster for lumber and the H. F. Alexander plans for new ships comes the announcement of Coastwise Line's purchase of two Libertys for the Alaska run. The Libertys are stopgap until two specially planned ships can be built. Plans for the latter are said to be before the Maritime Commission.

* * * * *

NAVY IN SAN FRANCISCO AWARDS $492,100 IN CONTRACTS DURING JULY

The Navy Purchasing Office in San Francisco has awarded contracts totaling $492,100 to four firms during the month of July.

The largest single contract--$300,000 for packing and crating of fresh vegetables--went to Honolulu Distributors, Inc., 35 Stillman St., San Francisco.

Two $50,000 stevedoring contracts were awarded to San Francisco firms --General Stevedore and Ballast Company, and Jones Stevedoring Company.

* * * * *

NAVY TO OPERATE ALL MILITARY SEA TRANSPORT

Defense Secretary Johnson has directed that all military sea transport be consolidated under Navy Control and that the Army begin turning over its ocean-going vessels October 1 to the new agency.

This new agency, the Military Sea Transport Service (MSTS), is to be commanded by a flag officer appointed by the Chief of Naval Operations with approval of the Secretary of the Navy.

The MSTS is similar in objectives to the Military Air Transport Services set up more than a year ago under the control of the Air Force but serving the Army, Navy and Air Force. A plan is under way to give the Army responsibility for all military transportation on land.

The MSTS initially will opearte 233 personnel transports, cargo vessels and tankers.

Since the end of the war American shipowners have invested more than $900,000,000 in ships and marine equipment.

* * * * *

BABCOCK & WILCOX AND FOSTER WHEELER SHARE BIG BOILER ORDER

The new U. S. Lines' superliner and naval auxiliary, designed by Gibbs & Cox and now under construction at the Newport News Shipbuilding & Dry Dock Company, will be equipped with boilers of the Babock & Wilcox Marine design, and half will be built by that company, with the other half being built by the Foster Wheeler Corporation. The units will all have Foster Wheeler Fin-Tube Economizers and Babcock & Wilcox Oil Burners.

* * * * *

SENATE VOTES FUNDS FOR MC TRAINING

The Senate voted $6,586,000 to maintain maritime commission training schools for the year which started July 1.

The amount is the same as that which had been voted by the House. It represents a boost of $3,934,950 over the figure which had been recommended by both the House and Senate Appropriations Committees.

* * * * *

PIPELINE TOWING PROJECT REPORTED

A domestic water carrier reportedly is drafting a request to the Interstate Commerce Commission for permission to tow pipelines, with their ends plugged, from the West Coast to Gulf Coast.

The name of the company could not be learned but well informed sources said the operation is designed to "beat railroad rates."

* * * * *

$2,000,000 LONG BEACH TERMINAL FOR ALEXANDER

The Long Beach Harbor Commission has estimated the cost of its commitment to H. F. Alexander for the coastwise terminal to be $2,000,000, and have tentatively selected Pier D in the outer harbor for the assignment.

* * * * *

SENATE UNIT DECIDES TO ALLOW FUNDS FOR ABS SHIP SURVEYS

The Senate Appropriations Committee has decided not to prohibit the use of Maritime Commission funds to pay for surveys and inspections by the American Bureau of Shipping.

The committee's decision reverses its original plan to have these inspections made by the Coast Guard.

* * * * *

PROTOTYPE LOW BIDDER

The Maritime Commission finds low bidder on the first of two "prototype" ships to be Ingalls Shipbuilding Corp., Pascagoula, Miss. Second low bidder is Newport News.

* * * * *

UNION OIL COMPANY OF CALIFORNIA will construct a research laboratory on 100 acres of land twenty-five miles southeast of Los Angeles. Twelve buildings in the unit will contain 120,000 sq. ft. of floor area. Cost is estimated at $5,000,000. Union's new tanker plans are nearing completion.

* * * * *

COASTWISE LINE PLANNING NEW SHIPS

Coastwise Line is planning construction of vessels specifically adapted for the Coastwise Alaska trade. Initial proposals for the construction of such vessels have already been placed before the Maritime Commission.

Book Reviews

By CARL E. McDOWELL
Associate Professor of Foreign Trade
Graduate School of Business, Stanford University

SEA ROUTES TO THE GOLD FIELDS. By Oscar Lewis. Published by Alfred A. Knopf (1949). $4.00.

The name of Argonaut usually conjures up visions of rugged pioneers, sometimes rowdy but always hardy, headed for the gold mines or the icy streams of the Sierra. The glorification of their part in California's history has too often destroyed the conception of a "49'er" as a human being. Why did he come West? How did he plan and how did he arrange his voyage? Under what conditions did he travel? And a hundred other questions, if answered, would humanize the men and women who flowed west, magnetized by the cry of "Gold!"

Oscar Lewis has accepted the challenge that "there was no such thing as a typical 49'er." In "Sea Routes to the Gold Fields," he has blended facts and excerpts from the narratives of the Argonauts themselves. The travelers are those from the shores of the Atlantic Coast and from New Orleans who chose to reach San Francisco by vessel rather than to move overland. By scholarly selection and careful construction of data, Lewis imparts to the reader the motives and the emotions of the travelers as well as their experiences.

The spread of the gold fever that struck the East Coast in December 1848 catches the reader at the outset in its whirling haste. The forming of joint-stock ventures, the diversion of shipping to handle the sudden movement of thousands of adventurers, the reckless casting aside of conservatism, social distinctions and restraint to join the "great democratic lottery," the misconceptions of life in the West and how to prepare for it—all these and other comments give evidence of the influence of gold on the commerce and history of the Atlantic Coast communities. Shipping men particularly will find of interest the author's recording of trading ventures, the conversion of ships and their description, the comparison of slow ships with the clippers, and so forth.

Many of the travelers and many of the episodes in Lewis' portrayal seem very real and often less than heroic. Referring to trading ventures, he recites "That so many failed was due as much to their urge for excessive profit as to the unpredictable gyrations of the California market." And one is amused by such significant details as the fact that tobacco in small packages found a ready market at fancy prices in San Francisco but that in large containers was not wanted at all.

The accounts of westward voyages follow the opening chapter on "The Departure." A later chapter on steamships explores voyages of later dates. Shipboard life, practical jokes of passengers and crews, breaches of decorum, food and meals, spiritual welfare, philosophy toward hardship, the rounding of Cape Horn, disasters, and other features enliven the pages. Excellent excerpts from voyagers' diaries, letters to newspapers, and other accounts are included.

One would gather the impression from "Sea Routes to the Gold Fields" that none of the travelers to San Francisco in 1849-1850 had anything other than gold in mind. Perhaps Oscar Lewis did not wish to dilute his account with references to less dramatic objectives. Nevertheless, among the "49'er" men and women were merchants and others who contributed to the foundation and later character of San Francisco and the gold country. To this extent, "Sea Routes" is unbalanced, but to an unimportant degree as far as most readers are concerned.

An excellent selection of illustrations—maps, copies of documents, etchings, and others—heighten the value of "Sea Routes to the Gold Fields" as a document.

PRACTICAL EXPORTING. By Philip MacDonald. Published by Ronald Press (1949). $4.00.

In this book the author develops a new means of studying export practices; the encyclopedia character of most handbooks is avoided; and the illustrative advantages of a case book are utilized. The reader is made to feel that he is part of an export firm.

Ease of handling and simplicity of presentation do not, however, result in incompleteness of treatment. The author undertakes to present "a thorough grounding in the fundamental procedures of the exporting business." The reader progresses, in logical sequence, from the establishment of an export department or the formation of an export entity, through the various branches of activity important to commercial export practice. This includes chapters on expanding representation and activities overseas, on information sources and how to use them, and on sales terms, marketing techniques, sales contracts and handling an export order on the mill.

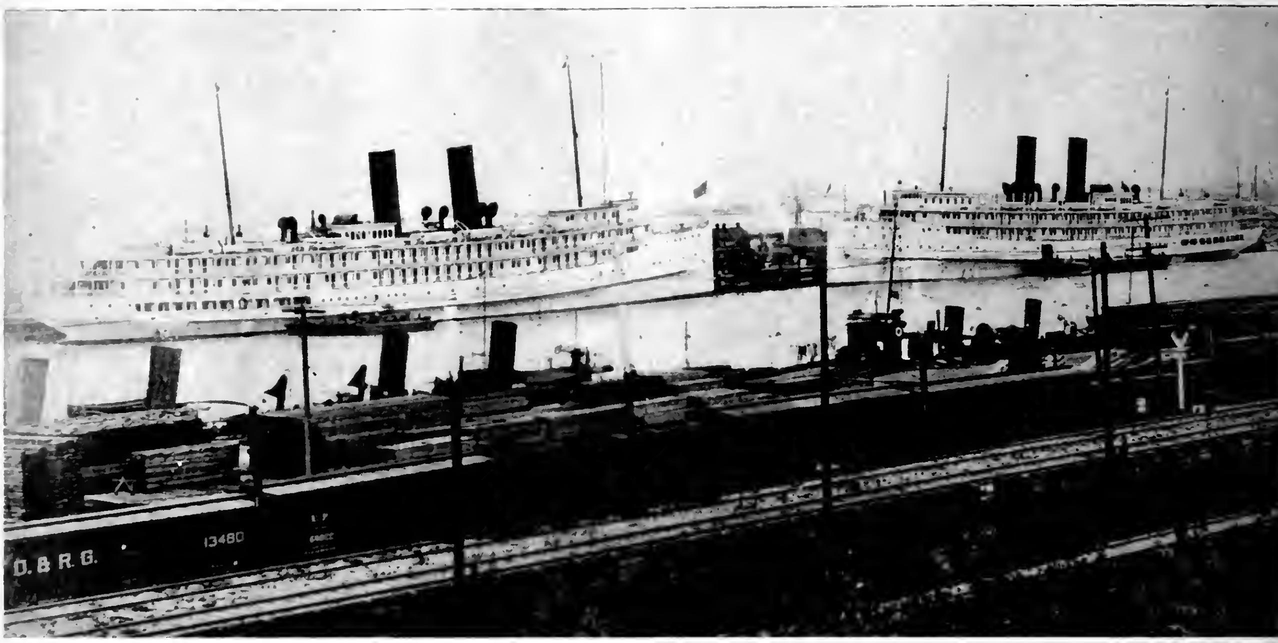
After the order has materialized, the reader in subsequent chapters becomes part of the operation of moving freight to seaboard, of meeting requirements of government controls, and of taking care of such details as are involved in marine insurance, preparing the CIF calculation, handling the financing of the order, and tending to the necessary details of credits and collections.

A very constructive contribution by the author is a chapter which follows a specimen export transaction from start to finish. This chapter includes valuable reproductions of business forms which have been accomplished in detail to conform with the purposes of the specimen transaction.

Four appendixes include metric equivalents and factors for conversion, foreign trade definitions, uniform customs and practice for commercial documentary credits fixed by the Seventh Congress of the International Chamber of Commerce, and marine insurance policy forms. The bibliography is concise and selective rather than all-inclusive.

The author is Export Purchasing Agent of Balfour, Guthrie & Co., Ltd., New York, and is a lecturer in the Department of Business and Civic Administration of The City College of New York.

Running Lights



From the files of Pacific Marine Review comes this picture of the well remembered "Yale" (left) and "Harvard." Each has made its last voyage.

T. S. S. "Yale" Goes Over the Hill

Walter W. Johnson Company of San Francisco and Stockton, California, recently purchased the famous coastal liner *Yale* from the U. S. Maritime Commission at Olympia, Wash. The historic express passenger and cargo carrier was towed to the Walter W. Johnson Company yards at Stockton where she is being broken up. This is one of a number of shipbreaking jobs undertaken by the well-known Johnson yard since the end of the war. The *Yale's* final service was use as a hotel ship for Navy personnel at Kodiak, Alaska.

West Coast Engine and Equipment Growing

Rapidly expanding in the Northern California region is the West Coast Engine & Equipment Company of Berkeley, who recently opened a plant in Sacramento in charge of Gene Rhea, manager. The Berkeley plant is managed by Muirson Wright, who is president of the company. Branches are also in Eureka, managed by Lou Truher, and Fort Bragg, manged by Jerry Steves. An ad-

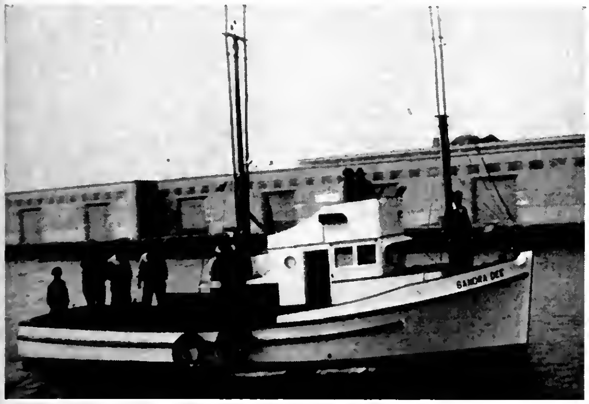
Jerry Steves, manager of Fort Bragg plant of West Coast Engine, Mrs. Steves and Frank Hyman, president of United Fish Company of Fort Bragg.

ditional San Francisco Bay region marine service depot will be opened at Clinton Basin in Oakland in the near future.

The company is distributor of marine and industrial Diesel engines, gasoline engines and power units, marine and industrial light plants, depth recorders and isodraulic combotrol.

One of the most recent Detroit Diesel installations by the company is the 85 H.P. 3-cylinder engine installed in Vince Mercurio's trim fishing craft *Sandra-Dee,* built by Genoa Boat Building Works at Fisherman's Wharf in San Francisco, where Joe Beviacqua and Edgar Parovel are partners.

West Coast Engine & Equipment Co. installed a Detroit Diesel on this fishing craft, the "Sandra Dee," built by Genoa Boat Building Works at Fisherman's Wharf in San Francisco.



West Coast Engine & Equipment Company plants.

Top: Berkeley plant.

Center: General Motors maintenance & service department in the Berkeley plant.

Inset: Sacramento plant.

Bottom: Eureka plant.

Scanlan Represents Detroit Diesel in California

Edward J. Scanlan has been appointed California Zone Sales Representative for the Detroit Diesel Engine Division, General Motors Corporation. He will direct General Motors Series 71 industrial, petroleum and marine Diesel engine sales through Detroit Diesel's distributor-dealer organization. Territory covered in the assignment includes the states of California, Arizona and Nevada.

Prior to joining the Division's sales staff, Scanlan served as Diesel Sales Manager with the General Motors industrial Diesel engine distributor in the state of Iowa.

He will establish headquarters in the vicinity of San Francisco.

Edward J. Scanlan

Annual L. A. Bilge Club Barbecue

(CAPTIONS FOR OPPOSITE PAGE)

1. Left to right: Jim Craig, Craig Shipbuilding and E. J. Amar, Port of Long Beach, just about to indulge in a large Bar-B-Qued steak avec abalone.
2. Shot from atop a beer barrel behind the bar. There's Maloney, Hare and Woodruff and a few other prominent harbor men.
3. That's Lloyd Nelson, president of Bilge Club (Texas Co.), listening to Sheriff Biscaluz of Los Angeles County tell a joke. Master of Ceremonies McHose is looking on.
4. Just finishing off with a little coffee, Bill Harrington, Cy Cyrus, Edwin Pike, Mr. Gram and a few others.
5. McHose congratulating Tom Forster on winning the second Big Prize for some mighty flashy golf.
6. Roy Campbell and "Bud" Bradford frying up the abalone—Mmmm.
7. A large group of milk drinkers in this shot. Chick Walker, George Hoxie, Dick Fark, Bill Moore and others.
8. The golf judges—honest as the day was long.
9. Joe Dennis about to devour a "Dagwood Special." Joe is with Craig Shipbuilding.
10. This was the winning baseball team. Rumor has it that many were restricted from work for many days due to a guy named "Charlie Horse."
11. Even the Pacific Marine Review photographer, Dave DeRochie, got into this one—a rare achievement. Someone insisted he get in the picture. There are Fryette and Walker, too.
12. Music was provided by a "Lost Opera Troop," Bill Eigle conducting.
13. Some more milk drinkers. Left to right in front: H. W. Crosby, George Curran, Frank Cavanaugh, George Sutherland, Charles Gardner, Chick Walker.
14. 'Tis "Bud" Bradford, who walked off with highest golf honors for the whole works. He also broils a mean abalone steak.
15. John Black surrounded by beer and friends.

General Steamship Acquires Own Bldg.

General Steamship Corporation, Ltd., announces the removal of its head office to its own building at 432 California Street. The move permits consolidation of activities which heretofore have been carried on in separate quarters.

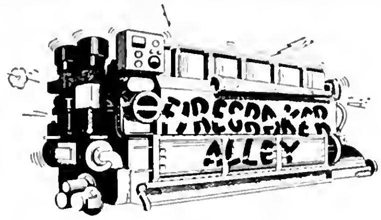
Henco Anchors—A Pacific Coast Product

Anchors of all sizes for commercial vessels will continue to be manufactured on the West Coast through an arrangement recently concluded by the C. J. Hendry Company. When the foundry, which for years cast the famous "Henco" line of anchors, discontinued its West Coast operations, the C. J. Hendry Company arranged for a continuing supply of these anchors by moving all patterns to a new foundry.

Smaller anchors for fishing and other light craft will continue to be available as well as a wide range of heavier anchors weighing from 2 to 10 tons. These larger anchors are tested and certified.

"Henco" anchors are made in the western U. S. in a complete range of large sizes. For ships in Pacific Coast waters this means an obvious economy and speed of delivery.

C. J. Hendry Company is also West Coast distributor for nationally known Naco chain and equipment. A complete stock is warehoused so delivery can be made without delay.



By Joseph C. Brewster
Chief Engineer

As the red blood courses through the human body, so courses a golden stream of lube oil to all the working parts of a diesel engine.

As God, in infinite wisdom, has made the blood to flow in definite quanities and pressures dependant upon the action of the body, so man in his wisdom has had to design a like control for the life stream of his engine.

Nature has provided a cleansing action in the blood stream called corpuscles. Man has to provide a cleansing action for this oil stream, which we call filters.

The type of oil, weight, quantity, and pressure of flow may vary considerably in different engines. This will depend on speed, clearances, weight, etc., and heed should be taken of the manufacturers recommendations. The oil should be kept clean by use of settling tanks, filters and centrifuges. Periodic laboratory tests of the oil should be made for contamination and when such contamination cannot be removed, the oil should be changed.

When the "bugs" enter your blood stream faster than nature can take care of them, you go to the hospital. When contamination enters the lube oil stream faster than its cleansing elements can remove it, your diesel engine goes to the repair yard.

(An advertisement of West Winds, Inc.)

Accident Prevention Safety Award Dinner

"Steel Making In America"

The United States Steel Corp. has prepared a beautifully illustrated book entitled, "Steel Making in America", which describes in simple terms the manufacture of steel in the United States from raw materials through finished steel products ready for shipment from the mills. The book also includes a brief history of the iron and steel industry from earliest times to the present.

Although prepared and published primarily for school students, the book will also be of interest to adult laymen who desire to further their knowledge of the manufacture of steel which serves them so extensively in their daily lives.

Foster Wheeler to Build Europe's Largest Oil Refinery

Foster Wheeler Corporation has been awarded a contract calling for the construction of Europe's largest oil refinery at Fawley, England.

The contract includes mechanical design, engineering, and construction of nine processing units.

Foster Wheeler will also erect all off-site facilities, including a complete steam plant, but not including tankage, marine facilities, and administration and laboratory buildings.

The new project is for Anglo-American Oil Company, Ltd., British affiliate of Standard Oil Company (New Jersey) and already is under way. The refinery, which will have a capacity of 110,000 barrels per day, is scheduled for completion in about three years, and has been estimated to cost $150,000,000. It will manufacture gasoline, kerosene, gas and diesel oils, heavy residual fuel oils, asphalts, and certain special products.

Top photo, left to right: J. H. Jensen, Matson; Gordon A. Woods, East Bay Marine Terminal Association; Capt. O. W. Pearson, Pacific Maritime Association; Peter Howard, Howard Terminals; Henry W. Clark, Pacific Maritime Association; Frank E. Wagener, C. J. Hendry Co.; Warren H. Pillsbury, U. S. Bureau of Employee Compensation.

Bottom photo: General view of group awaiting presentation of annual safety awards.

Port Stewards' Annual Picnic

Opposite: Tom Taylor, Pacific Far East Line (center), chairman of the recent Port Stewards' family picnic, flanked by lieutenants Paul Baker, Pacific Transport Lines, Clarence Grochowski, Pacific Transport Lines, Gene Blank, Pope & Talbot, and Al Buckner, States S.S. Other loyal committeemen were Paul Babcock and Russ Trevellian.

Below: Port Stewards, their wives and children at annual picnic of the Port Stewards' Association of the Pacific Coast, held June 25th in the Oakland hills. Next social event is the Millbrae Country Club ruckus on August 26.

New Worthington Officers

Hobart C. Ramsey has succeeded Clarence E. Searle as president of Worthington Pump and Machinery Corporation, and Searle has been named vice chairman of the board of directors.

Ramsey joined Worthington in 1920, after serving in World War I as a Lieutenant Commander. His first job with Worthington was as a sales engineer in the Export Department, becoming manager of that department in 1922. From 1925 to 1937, he served successively as assistant general sales manager, vice president in charge of international business, and vice president in charge of engineering and manufacturing operations, including seven years in Europe with Worthington's foreign operations. In 1945, Ramsey was elected executive vice president.

Ramsey is a native of New Jersey and graduated from United States Naval Academy at Annapolis in 1915, where he had earned a prominent reputation on the varsity football squad and in other sports. His association activities include past president and chairman of the Navy Industrial Association; a director of National Association of Manufacturers; chairman of Committee on Patents and Research of N. A. M.; chairman of the Panel on Mechanical Equipment of the Research and Development Board of the National Military Establishment.

Succeeding Ramsey as executive

H. C. Ramsey

E. J. Schwanhausser

J. J. Summersby

vice president is Edwin J. Schwanhausser, vice president in charge of sales since 1945, when he was transferred from Buffalo Works. He started with Worthington in 1915 as an engineer at the Harrison Works and has served successively as assistant manager at Harrison Works, manager of Buffalo Works, and appointed a vice president in 1939.

John J. Summersby has been elected Vice President in charge of Sales. Having joined the Worthington organization in 1916 and spending a year at the corporation's former Cincinnati Works, he has been connected with the sales department ever since, first as a salesman and later as district office manager at St. Paul; sales manager at Holyoke Works; and assistant general sales manager. In 1937 he was appointed assistant vice president and general sales manager.

Succeeding Summersby as assistant vice president and general sales manager is Thomas J. Kehane who joined Worthington as an office boy at the age of 14. Later he studied engineering and architecture at Mechanics Institute and Pratt Institute. He has advanced through various positions in the Sales Department, and in 1944 was appointed Commercial Vice President, Pacific Coast. For the past two years he has served as Pacific Coast Regional Vice President of the Navy Industrial Association.

T. J. Kehane

Merchant Marine Naval Reserve Retirement Law

Merchant Marine Naval Reserve officers on the Honorary Retired List are now eligible to enjoy the benefits of the Reserve retirement provisions of Title III, Public Law 810. In accordance with Public Law 41 of 81st Congress, it is now possible for Honorary Retired List personnel to be re-retired so that they may qualify for Reserve retired pay, providing they fulfill the other requirements of the retirement law. Originally the law was interpreted as making personnel on the Honorary Retired lists ineligible for the benefits.

All officers of the Naval Reserve must have a physical examination at least once every 4 years. If they are found not physically qualified for active service, they will be honorably discharged or, within the discretion of the Secretary of the Navy, placed on the Honorary retired List. In determining an officer's qualifications for active service, due consideration is to be given to the character of the duty to be assigned him in the event of war or national emergency.

Robert Haig Retires From Sun Shipbuilding

Robert Haig, one of the outstanding shipbuilding engineers of America retired from active service at the Sun Shipbuilding and Dry Dock Company, Chester, Penna. on July 1. Haig, who was senior vice-president of the Company, will be 88 years old next November 24. At a dinner tendered him by his associates he announced that he planned to travel and have a good time.

Robert Haig

Robert Haig came to Sun Ship back in 1916 from Lloyds which he had represented in Philadelphia. He helped to lay out the shipyard on the banks of the Delaware River, he supervised the construction of shops and shipways, he laid the keel of the first vessel built by Sun Ship and for 33 years he has been an active, energetic figure in the shipbuilding industry of the nation.

Haig helped build ships that contributed to victory in World War I and World War II. John G. Pew, president of Sun Ship said, "He is one of the best shipbuilding engineers in the business and knows ships from keel to mast-head."

Robert Haig who was born in Sterlingshire, Scotland, learned shipbuilding on the Clyde. He then sailed the seas and today he holds papers as a chief engineer.

After being at sea several years he became associated with Lloyds and represented that association in America up to the time that he was put in charge of the building of vessels at Sun Shipyard.

During World War II, when this plant turned out 250 vessels and 35 large car floats from Pearl Harbor up to October, 1945, he saw the yard grow from 8 to 28 shipways. The peak of employment was in July 1943 when there were 35,633 on the payroll.

Haig resides at Swarthmore, Penna. He is a member of the American Bureau of Shipping, Lloyds Committee, St. Andrews Society, Union League and numerous other groups.

Pacific Transport Lines Appoints George E. Talmage

George E. Talmage has taken on duties as vice-president in charge of traffic for Pacific Transport Lines, Inc.

Talmage, an outstanding figure in American steam shipping for many years, both in private and governmental capacities, until recently was executive vice-president of Ajax World Wide Freight Corporation. Prior to that he was a special assistant in the United States Maritime Commission on postwar rehabilitation and re-establishment of domestic water shipping.

Talmage's appointment is another manifestation of the interest of Pacific Transport Lines in the development of greater export-import cargo volume for Pacific Coast ports. Talmage will participate in regional plans to promote greater utilization of western ports.

The appointment of Stanley Coppel as administrative assistant to Vice-President Maitland S. Pennington was also announced. Formerly assistant freight traffic manager, Coppel will be on special assignments.

Cleveland Diesel's Wilmington Branch Moves

The Wilmington Branch Office of the Cleveland Diesel Engine Division of General Motors Corp. recently moved to 433 Marine Ave., Wilmington, Calif. Their telephone number is now TErminal 4-4098.

B. T. Eagerton Promoted by Nordberg

B. T. Eagerton has been appointed to the position of Vice President in charge of the Export Division of Nordberg Manufacturing Co., Milwaukee.

After several years of varied experience, including operation of his own automotive equipment distributing agency in the Southeast and as Cleveland branch manager of Standard Gas Engine Co., Eagerton joined the Cleveland Tractor Company in 1928. He was export sales manager of that company, and when it was merged with the Oliver Corporation he became assistant manager of the export division of Oliver. He has been export manager of Nordberg since leaving the Oliver Corporation in 1946.

A native of South Carolina, Eagerton studied commerce at Georgia Tech.

B. T. Eagerton

John P. McArthur

John P. McArthur Named Manager By Worthington

Worthington announces the appointment of John P. McArthur to the position of Manager, West Coast Sales, with headquarters in San Francisco. He will supervise the activities of the Los Angeles, San Francisco, Seattle and Salt Lake City District Offices.

A graduate of Penn State, McArthur was born in Altoona, Pa., in 1907. He joined Worthington in 1936 as an Estimating Engineer in the Philadelphia District Office. He became a Sales Engineer two years later and in 1945 was made manager of the San Francisco District Office.

J. J. Coney Heads PATA

J. J. Coney, Vice-President and General Manager of Hillcone Steamship Company has been elected President of the Pacific American Tankship Association. Coney has been connected with the shipping industry for many years. He is President of Deconhill Steamship Company and was an industry member of the War Labor Board during the war.

Joseph J. Coney

APL Streamlines Service Departments

Formation of a Services and Supply Department to consolidate American President Lines purchasing, catering and other services formerly handled by the Steward's Department has been announced by George Killion, Company President. The new department will be under the supervision of Charles Crouch as Director of Services and Supply.

Consolidation of the purchasing and catering departments is a further streamlining of the Company's internal organization aimed at better service at lower cost.

The department will purchase all consumable supplies, establish purchasing procedures for other departments,

Charles Crouch, Director of Services and Supply, American President Lines.

and endeavor to improve present standards of service through increased efficiency.

Crouch was selected to direct the organization of the Services and Supply Department because of his long experience in organizational and merchandising capacities.

All phases of the Company's purchasing and catering activities will be studied by Crouch. Purchases of food, deck and engine stores, stationery and other items will be considered for both quality and quantity. Procedures for the elimination of waste will be established, and the use of all materials requisitioned will be studied.

Also, Crouch will direct the establishment and maintenance of new catering standards in keeping with APL's continuing policy of always providing the best.

Crouch joined American President Lines a year ago as Special Assistant to Killion. He has conducted several surveys of various phases of Company operations, including a business survey of the Orient.

Prior to his association with APL, Crouch, in 1931, directed the organization of Lucky Stores, and was its President until 1947. For years, he has been prominent in national merchandising and business circles.

Marine Objective

Complaining Customer: "I don't like any of these dresses. I think I would look well in something flowing."

Tired Clerk: "Madame, why don't you jump in the creek?"

Mitchell Takes Over For McDonald At Du Pont

Theodore J. Mitchell has been appointed San Francisco Regional Industrial Sales Manager, Finishes Division, E. I. du Pont de Nemours & Co. Mitchell has been affiliated with the Du Pont Company for the past twenty-three years as an Industrial Finishes Specialist. Prior to assuming his new post in San Francisco, he was Sales Manager of Chicago Regional Special Industrial Sales, where petroleum, aviation, marine, railway and steel fabrication industries have been his specialty for many years.

Mitchell is recognized as an authority in his fields and brings a wealth of technical information with him. He succeeds George A. MacDonald, who passed away July 31.

Theodore J. Mitchell

Maybaum Succeeds Lancsweert At U. S. Lines

W. Herbert Maybaum, who succeeds Wm. C. Lancsweert as U. S. Lines' passenger manager in Chicago, grew up with the company, which he joined in New York in 1910. He served with the 105th Field Artillery of the 27th Division in World War I and saw action in the Argonne and St. Mihiel sectors. He was experienced in every branch of the passenger business when he was promoted in 1923 to the post of passenger manager for the company's office in Cleveland. In 1934 he was put in charge of the company's agency department which was re-organized under his direction. Two years later he became passenger manager of the Los Angeles office and in 1938 was appointed Pacific Coast passenger manager with headquarters in San Francisco.

Maybaum served as aide to the Chief of Staff of the 12th Naval District, San Francisco, for a year and was commanding officer of the Receiving Station for two years. After the war he was sent to Germany to organize machinery for handling the movement of displaced persons from Germany to the United States.

W. Herbert Maybaum

New Firm— W. H. Schwartz

W. H. Schwartz, formerly Design Engineer for the Alvin R. Campbell Company, has announced the establishment of his own firm of W. H. Schwartz located at 2351 Jerrold Ave., San Francisco. The firm is specializing in the design and manufacture of marine and in-industrial material-handling equipment. Production of pallet racks is already under way.

Keep Posted

New Equipment and Literature for Yard, Ship and Dock

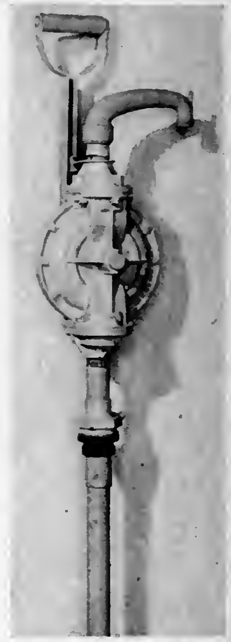
Diaphragm Type High-Vacuum Hand Pump

Tokheim Oil Tank & Pump Company, Fort Wayne, Indiana, announces introduction of a diaphragm-type high-vacuum hand pump. Designed for the petroleum and marine industries as well as for rural and general industrial use, this new pump is available in several models including barrel and underground tank types. High suction efficiency enables it to pump fluids on as much as a 25-foot vertical lift.

The pump dispenses fluid in a steady flow on both back and forth strokes and, according to the manufacturer, will handle water, gasoline and any petroleum liquid that will pour. Company engineers report that it will operate efficiently at extremely low temperatures.

According to the manufacturer, this new hand pump will deliver 20 gallons per 100 strokes a minute and will prime a 20-foot lift in 12 strokes. It is built of aluminum alloy with top and bottom housings of rust-proof pressed steel. The diaphragm is liquid-sealed and supported by stainless steel plates. This new pump is easy to service.

It is available with 8-gallon counter-totalizer and with hose and automatic shut-off nozzle or spout with pail hook. It is also available with sturdy cast-iron base for use with underground storage tank.



New diaphragm-type High Vacuum Hand Pump manufactured by Tokheim Oil Tank and Pump Co. Shown is Model 965 for use as barrel pump.

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

580 Market Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

....Issue. Page No...................

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(Identify by name of manufacturer and catalog)

NAME..

BUSINESS..

ADDRESS...

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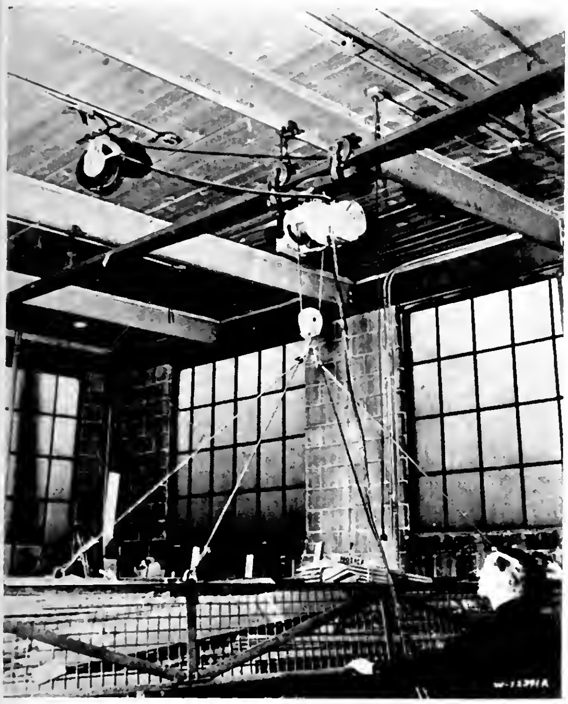
Bridle Sling For Traveling Hoist

A four-part bridle-sling provides a simple solution to the difficult problem of hoisting such loads as sheet-steel, machinery, ship-to-shore cargoes, construction equipment and large rectangular-shaped loads. The large basket-like container carries fabricated sheet-metal sections from one part of the shop to another. It comprises an angle-iron frame and wire mesh body.

The ends of the sling cables are permanently secured to the frame. Thimbles prevent wear where the cables



Picture shows four-part bridle sling used with Yale & Towne traveling hoist.

engage the hoist hook. The Yale hoist handling the load is a ¼-ton wire-rope trolley-mounted unit. The load is raised and lowered by push-button control and is pushed along the trolley by shoving the load. A reel suspended from the ceiling takes up slack electrical supply cable and eliminates dangling cords. A useful chart indicating safe loads which can be carried by this type of sling is included below for a typical wire-rope type cable.

SAFE LOADS

Sling Size	60°	45°	30°
¼"	2,100	1,700	1,150
⅜"	4,900	3,900	2,700
½"	8,500	7,000	4,700
⅝"	13,000	10,500	7,200
¾"	19,500	15,500	10,500
⅞"	25,500	20,000	14,000
1"	32,500	26,000	18,000
1¼"	49,000	39,000	27,000
1½"	72,000	57,000	40,000

Institute of Navigation Election

Rear Admiral Gordon McLintock, USMS, has been elected President of the Institute of Navigation for the Institute year beginning August 1, 1949, it has been announced at the University of California. Admiral McLintock is Superintendent of the U. S. Merchant Marine Academy at Kings Point, New York.

Paul Rosenberg has been appointed Technical Advisor to the President of the Institute. Dr. Rosenberg is president of Paul Rosenberg Associates, New York firm of consulting physicists.

Samuel Herrick, professor and chairman of the Department of Astronomy at the University of California, Los Angeles, has been elected Executive Secretary of the Institute. Keith F. Smith of Los Angeles has been elected Treasurer.

The following vice-presidents were elected for the new Institute year:

Rear Admiral Leo Otis Colbert, USCGS; Brigadier General Paul T. Cullen, USAF; Ralph S. Damon; Dr. John Howard Dellinger; Sherman Fairchild; Rear Admiral Telfair Knight, USMS; Edward A. Link; Rear Admiral A. M. Pride, USN; Captain P. V. H. Weems, USN (Ret.).

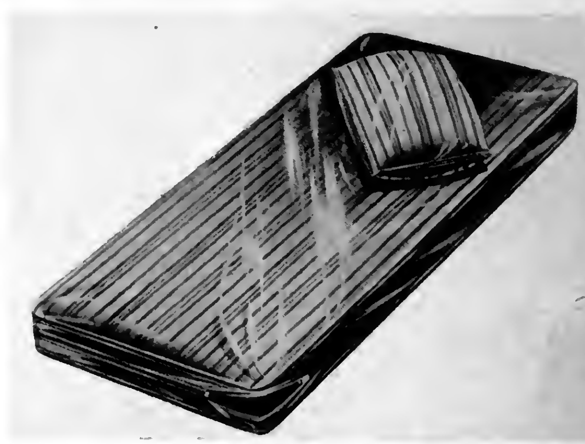
Captain M. E. Crossman, USMS, was elected Western Regional Vice-President.

The national offices of the Institute of Navigation are located at the University of California, Los Angeles, California.

SaniPhilm Covers

Mattress covers, pillow cases and headrest antimacassars for hotels, resorts, railroad pullmans, buses, aircraft and steamships are now being made out of a new vinylite plastic that has the waterproof qualities of rubber and the feel and texture of fine percale sheeting. Like cloth, this material does not crack, peel, stiffen or easily tear.

Using this material in combination with the latest-



type high frequency electronic-eye welded seams is the Philmont Manufacturing Company, 60 Honeck Street, Englewood, N. J. All seams, and even slide fasteners, are electronically welded, forming a bond of the joined parts that is as strong, as durable and as waterproof as any part of the material itself. This outmodes thread sewing which leaves easy-to-tear needle holes, cement-seaming and old-fashioned methods of heat joining. These Philmont products are sold under the name SaniPhilm.

Sanitation of Vessels

The Division of Sanitation of the Federal Security Agency, Public Health Service, has available a booklet entitled "Principles of Sanitation Applicable to the Construction of New Vessels" which was prepared after consultation with individuals and groups concerned with the design, construction, operation, and maintenance of vessels. The application of the practical standards of sanitation brought out in the booklet will aid in the prevention of the transmissioin of disease and in the promotion of the health and welfare of those using the vessels.

In this booklet sanitation categories have been established to include: Potable water system, wash water system, waste disposal, food sanitation facilities, ratproofing, and others, as, for instance, swimming pools.

Upon request, the Vessel Sanitation Branch will assist vessel owners, naval architects, and shipbuilders in the development of specifications and plans for new vessels relating to the sanitation problem. Following review of plans submitted to them, constructive recommendations will be made. To newly constructed vessels meeting the principles of sanitation contained in this booklet, the Public Health Service will give a Certificate of Sanitary Construction following their completion.

Seamen's Pay Up 7 Times Since '45

Basic wages for American able seamen, the highest in the world, have increased 174% since 1941, according to the American Merchant Marine Institute. Not including the value of food and lodging, which is supplied by the steamship companies, the prewar monthly basic income of an AB was $82.50. It had reached $145.00 at the war's conclusion.

Since October, 1945, seven successive wage increases have been given American seamen. By these, the monthly basic wage has been upped to $226.01. In addition an American seaman's overtime earnings run to about 30% of his basic pay. The monthly basic pay earned on a typical U. S.-flag Liberty-type cargo vessel from master to messboy, follows:

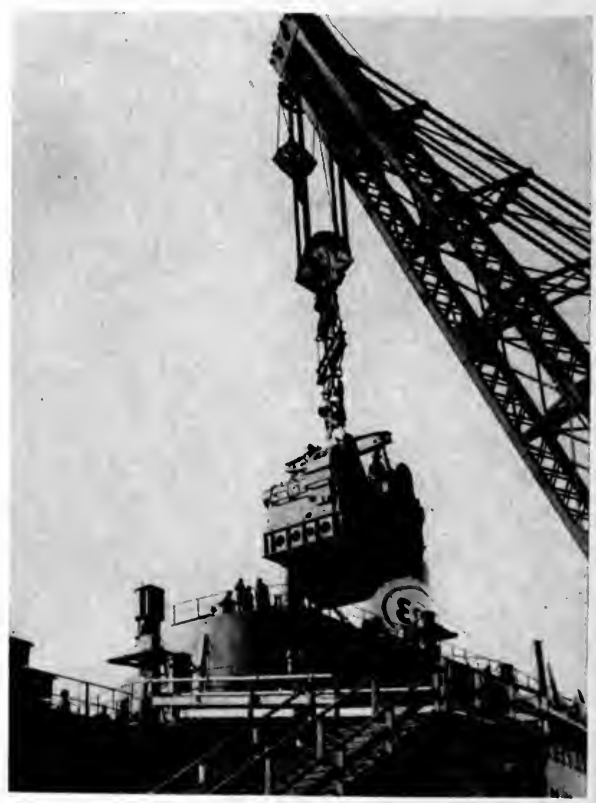
Rating	*Basic Monthly Pay*
Master	$687.39
First Officer	427.11
Second Officer	373.86
Third Officer	343.10
Chief Engineer	647.65
First Asst. Engineer	433.77
Second Asst. Engineer	379.69
Third Asst. Engineer	348.45
Radio Operator	323.51
Boatswain	288.94
Able Seaman (6 per ship)	226.01
Deck Utility	237.84
Ordinary Seaman (3 per ship)	193.47
Deck Engineer	258.54
Oiler (3 per ship)	226.01
Fireman Watertender (3 per ship)	226.01
Wiper (2 per ship)	223.05
Chief Steward	281.75
Chief Cook	258.54
2nd Cook & Baker	234.88
Messman (3 per ship)	193.47
Utility (2 per ship)	193.47

Leslie's Sales Manager Visits Pacific Coast

R. W. Boettiger, sales manager for the Leslie Company, Lynhurst, N. J., recently called on Leslie Company marine and industrial agents and distributors in Seattle, Portland, San Francisco and Los Angeles. In the picture, left to right, are: John Cordes of Cordes Bros.; R. W. Boettiger; Ralph Murray and Lowell F. Jett, both sales engineers for Cordes Bros.

Harness for 12,500 Horses

The 175,000-pound piece of marine driving equipment, being swung aboard a new tanker under construction, is a double-reduction gear unit made by the General Electric Company. It harnesses the driving power of the vessel's 12,500-horsepower propulsion unit by translating the thousands of revolutions per minute of the turbines into a usable 112 rpm for the propellers. The tanker is one of the 10 being built for the Standard Oil Company (New Jersey) at the Newport News Shipbuilding and Drydock Company yards in Newport News, Va.



George Muller Memorial

In memory of the late George Muller, one of San Francisco's most outstanding naval architects, a Memorial Book Fund in Naval Architecture has been set up at the University of California by his many friends.

Born in San Francisco in 1868, George Muller started his apprenticeship in shipbuilding at the Union Iron Works (now Bethlehem Steel Company, San Francisco Yard) in 1884. He studied Naval architecture at the University of Glasgow and devoted the rest of his career to the practice of this profession on the Pacific Coast.

George Muller was associated with Behlehem, Standard Oil Company, the United States Shipping Board, and finally with the Moore Dry Dock Company, retiring in 1945. While at Union Iron Works he worked on the *Arago,* the first steel vessel built on the Pacific Coast. He also worked on the design of the famous battleship *Oregon,* the Japanese cruiser, *Chitose,* and several other cruisers, destroyers and submarines, as well as on a number of commercial vessels. He aided in the design of the unique hydraulic lift drydock which gave excellent service at the Union Iron Works until irreparably damaged in the 1906 earthquake.

George Muller

George Muller especially enjoyed helping young people who were interested in naval architecture so it is particularly appropriate that his memorial is to be of assistance to students of naval architecture on the Pacific Coast. The memorial fund will remain open for those who might wish to participate. Contributions may be addressed to: George Muller Memorial Book Fund in Naval Architecture, Office of the President, University of California, Berkeley 4, Cal.

Kelvin-White Moves to New Location

The Kelvin-White showroom on the Pacific Coast is now located at 4000 East Anaheim Blvd., Long Beach, California.

Marine Turbines and Gears

(Continued from page 57)

wear down. If the babbitt surface is badly scored so that smooth surfaces of sufficient width to be oil-film-forming cannot be attained on cleaning up or if the scoring is such as to reduce appreciably the load bearing area of the babbitt. then the bearing must be replaced. If the bearing wear down is sufficient to appreciably affect the alignment or the axis location of the rotor involved, then replacement is necessary. Also certain types of stabilizing bearings used for high speed lightly loaded journals require close clearance to be effective and must be replaced if wear results. The recommended maximum wear down of bearings is usually given in the turbine and gear instruction book.

There are several methods in general practice for measuring bearing wear; to name a few (1) direct measurement of journal diameter and bearing bore with outside and inside micrometers, (2) measurement of bridge gauge dimensions or micrometer depth dimensions, (3) measurement of bearing crown thickness, (4) measurement by insertion of feelers between journal and top of bearing. Each method has certain advantages, but in general (1) and (3) are preferred for the simple reason that they require rolling out the lower half of the bearing, thus allowing an examination of the babbitt surface to be made. Method #3 is particularly effective for checking gear bearings where it is required that fore and after journal locations be kept constant so that gear alignment will be maintained. The other methods (2) and (4) are of distinct value for perfunctory checking where time limitation or general non-availability of the bearing is involved.

Another cause for replacement of bearings is loose babbitt in the shell caused by breaking of the bond between babbitt and shell. Bearings with loose babbitt have operated for long periods of time, but certainly on bearings for high speed journals it is wise to make replacement as the babbitt may tend to break up.

Conclusions

The modern marine steam turbine and gear are built to high standards of design and manufacture. Service under all types of conditions has proved the efficiency and reliability of the units. The turbine and gear are high class machinery and primarily require high class workmanship and thus their operation and maintenance should not be undertaken by inexperienced men. With good operation and good planned maintenance the ship operator will find that the marine turbine gear auxiliary and propulsion unit will give many years of over-all economical and reliable service.

Navy Assigned All Ocean Transport For Services

Responsibility for all ocean transportation for the Armed Forces has been assigned to the Department of the Navy by directive of Secretary of Defense Louis Johnson.

The directive establishes a military sea transportation service within the National Military Establishment. The directive assigns control, operation and administration of the unified agency to the Department of the Navy and directs that it shall be commanded by a flag officer appointed by the Chief of Naval Operations with the approval of the Secretary of the Navy.

To facilitate the initial operation of Military Sea Transport Service, Secretary Johnson directs not only the transfer to the unified agency of all Government-owned vessels now assigned to the Army and Navy for sea transportation of personnel and material, but also of personnel, facilities, equipment and funds previously provided the services for sea transport operation and the provision of logistic support.

Consolidation is ordered to be initiated not later than October 1, 1949. Initially, MSTS will operate 233 personnel transports, and cargo vessels and tankers. The vessels to be assigned from the Naval Transportation Service include nine personnel transports, 12 cargo vessels, and 73 tankers. The Army will transfer a total of 129 ships to the new agency.

The Army also has under charter 191 vessels for which MSTS can renew charters if they are needed.

The ships being assigned to MSTS by the Navy do not include all transports, cargo vessels, and tankers operated. The ships not assigned to MSTS are classified either as combatant vessels or as vessels used for mobile support of the Fleet.

In addition to its peaceful operations, MSTS is charged with preparing plans for its expansion and employment in time of emergency. These plans will be based upon policies and directives issued by the Joint Chiefs of Staff and the Munitions Board.

Book Review

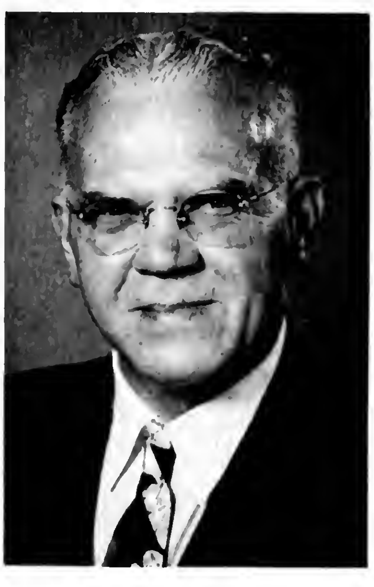
ELEMENTS OF DIESEL ENGINEERING. By Orville L. Adams. Published by Norman W. Henley Publishing Co. (1949). $5.00.

This is a rewritten and revised book based on Orville Adams' previous work of the same name. The fundamentals of Diesel Engineering are presented in logical, step-by-step manner, with no confusing language. A Diesel research engineer, the author taught classes of Army and Navy personnel during the war as a Naval Officer in charge of Diesels, and therefore he combines practical experience with an intimate knowledge of the requirements of the school and college.

Subjects covered in the book include Diesel Definitions, Mathematics of Diesel Engines, Fundamental Engine Cycles, Fuel Injection Systems, Combustion and Heat Distribution, Rating, Testing, and Performing, Air Intake and Supercharging, Interpretation of Diesel Indicator Diagrams, Diesel Fuel and Lubricating Oils, and Fuel Properties and Engine Performance. "Problems" and "Questions and Answers" after each chapter are designed to help the class room teaching of this subject.

Westinghouse Names Howe Engineering Head

Wilbur A. Howe, below, of Berkeley, Cal., has been named manager of engineering and service for the Pacific Coast District, Westinghouse Electric Corp. He succeeds A. W. Copley of Palo Alto, who retired in June after 46 years' continuous service with Westinghouse. Headquartered at 410 Bush St., San Francisco, Howe will have charge of Westinghouse engineering activities in eight western states, Alaska and Hawaii.



"In any profit-sharing scheme there always comes up the awkward question: how do you distribute the losses?"—CAPT. A. E. MARPLES.

Standard Oil Promotes Reginald Warner

Appointment of Reginald C. Warner as assistant manager of its Marine Department is announced by the Standard Oil Company of California.

For many years a chief engineer on vessels of Standard's tanker fleet, Warner has more recently acted as inspector of operations and maintenance for the company's marine department.

During the last ten years he also has supervised construction, here and abroad, of tankers and petroleum barges for Standard and some of its subsidiary companies.

Warner joined Standard in 1921 as a first assistant engineer. In his new position he replaces A. E. Kihn, recently named manager of Standard's Marine Department.

Carrier Expands West Coast Facilities

The opening of a new and larger San Francisco office and service shop to act as West Coast regional headquarters for Carrier Corporation's marine refrigeration and air

John F. Kooistra

conditioning business was announced by Leo Starr, Carrier Marine Department manager.

John Kooistra, veteran Carrier engineer, and manager in San Francisco, is in charge of the expanded operation. West Coast marine sales, engineering and service will be handled by the office, which is now at 251 First Street in the heart of San Francisco's shipping district. A service shop with an expanded stock of spare parts and accessories is included in the new facility.

R. C. Warner

Cycloidal Propulsion

(Continued from page 60)

screw propulsion similar to MTL-951, and from results of the performance of the two craft a comparsion will be made of the two types of propulsion.

The Transportation Corps Board is currently constructing a 127′ mineplanter for the Army Mineplanter Service. Two Voith-Schneider cycloidal propellers will be installed on this vessel. Extensive tests of the craft will determine the effectiveness of cycloidal propulsion for use in mineplanting vessels.

As a result of this concentrated effort and study by the Transportation Corps, commercial operators are beginning to investigate the use of cycloidal propulsion. One such operator is the Virginia Ferry Company, which has contracted for the design and construction of a propeller similar to that developed by TC, for installation in a ferry which will operate between Cape Charles and Little Creek, Virginia. The prime function of this propeller will be for maneuvering the ferry in very close waters.

Dahlgren Is Marine Superintendent For Johnson Line

Succeeding Capt. Lagerberg as marine superintendent for Johnson Line at San Francisco is Capt. Ove Dahlgren, who recently arrived on the Pacific Coast from similar duties in Sweden.

J. W. Thomson Retires as Bethlehem Safety Engineer —Anderson Succeeds Him

J. W. Thomson, Safety Engineer at the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division, retired after 43 years of service with the company, 32 of them spent in his present position. Thomson is well-known in Industrial Safety circles in this area, having assisted State authorities in writing the first shipyard safety code in 1921. He was in charge of the San Francisco Yard's safety program during World War I and in World War II when the Yard established a national safety record of 124,000,000 man-hours without a single fatality.

C. R. Anderson has been appointed to succeed Thomson as Safety Engineer.

Anderson came to work for Bethlehem in 1942 as a safety inspector and was subsequently made safety department supervisor and assistant to Thomson.

Anderson is a native of St. Paul, Minn. He joined Bethlehem after 17 years with the Shell Oil Company in Seattle and San Francisco, 11 of them spent in that company's safety department.

C. R. Anderson

Box Patch For Hull Repairs

A box patch for hull repairs was recently developed by two San Franciscans, George Rowley and Jack Young, riggers and divers on the San Francisco waterfront, both former government shipyard employees.

The patch is a picture-frame device made in various sizes and designed exclusively for the repair of breaks in hulls of ships. It is made of rubber covered steel with a plywood or steel backing. The size of the hole to be covered determines the layers of rubber which are built up to the depth necessary to cover the work.

The patch is put in place over a hole or leak of any kind, using hogging lines or lowering-away lines and fore-and-aft lines, and it is held in place with a jack and "A" frame. It adapts itself to the curve of the hull plate while the welding repair is being made.

The largest size made thus far is 10 ft. square.

The patch can be used repeatedly.

The device is being marketed by Universal Divers Service, 942 Hollister Ave., San Francisco.

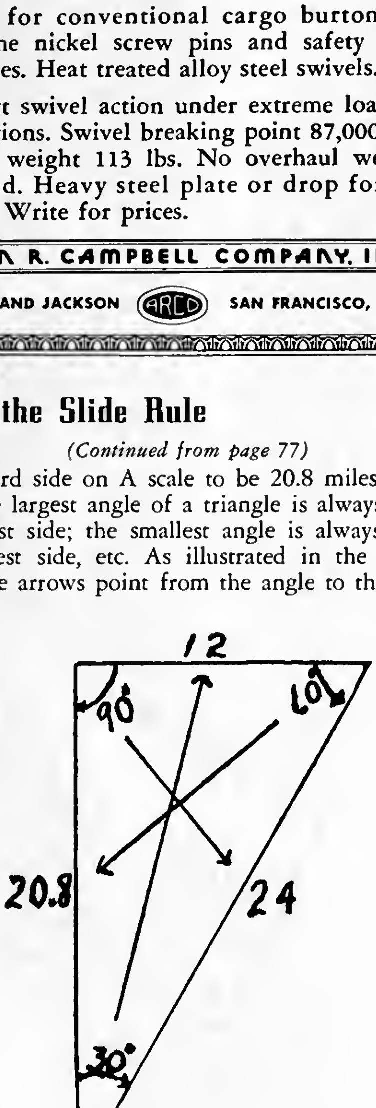
Below.
Left: Front view of box patch for sea valves showing inside without asbestos sack.
Right: View of box patch in place on hull of ship.

Pictures taken at San Francisco Naval Shipyard.

Use of the Slide Rule

(Continued from page 77)

of the third side on A scale to be 20.8 miles. In other words the largest angle of a triangle is always opposite the longest side; the smallest angle is always opposite the shortest side, etc. As illustrated in the following sketch, the arrows point from the angle to the side opposite.



Now to really get down to the use of the slide rule. The most important phase of mastering the use of the slide rule is learning to read the scales correctly. In this about the only person who can help you is yourself. Let us first take the A scale. Upon observation we can see that it is divided into two parts of equal value, each of these parts are subdivided into lesser parts running from 1 to 10. The leftmost division is read from left to right as .01 running up to .1; then the right half of A scale is read as .1 running up to 1; returning to the left end of the scale we read from 1 to 10 and on the right half from 10 to 100. Back to the left half we read from 100 to 1000, then on the right half from 1000 to 10,000 etc. indefinitely. Since B scale is identical it is read in the same manner.

Now to D scale which is read from the left as .01 to .1 all the way across the scale; then returning to the left end of the scale it is read from .1 to 1 at the right; and again returning to the left we read from 1 to 10; then back again and from 10 to 100 and repeating the procedure as long as necessary.

The C scale is identical to the D scale and is read in the same manner. The Cl scale is graduated in the same manner but from the right to the left. The K scale is separated into three divisions reading from left to right and is read in much the same manner.

The S & T scales are graduated in degrees and require no explanation. For interpolation by eye between the lesser graduations navigators might look on them as they do the vernier of a sextant to determine the value of the smaller graduations.

It is quite evident that space will not allow a detailed explanation of the various uses in this article, so to throw a little food for thought the readers' way, it might be well to point out that by setting the cursor or hairline on the value of a given number on A scale we can read

the square root of that number in register on D scale. As an example: 3 on the D scale is in register with 9 on the A scale. At the same time we can see that in register on K scale is 27 or the cube of 3. So we have the square root of a given value on A scale in register on D scale and the cube root of a value on K scale in register on D scale.

In a following article detailed instruction in the use of the slide rule for the solution of Deck Officers' problems will be given. In the meantime hold on to this article and practice reading the scales.

Beginners' slide rules are available at only a slight cost and they are satisfactory for most Deck Officers' problems.

East Asiatic Company's Transpacific Service

The East Asiatic Company, Inc., 465 California Street, San Francisco, announces replacement of their present vessels on the transpacific service with the S.S. *Nikobar*, S.S. *Tranquebar* and/or S.S. *Serampore,* which have a cruising speed of 15 knots and are under Danish flag, manned by Danish officers and crew. All these vessels are equipped with deep tanks and limited refrigeration space. They will be on a regular service from this coast to Oriental ports.

American Manufacturing Company Appoints Charles J. Dilke

American Manufacturing Company, Brooklyn, N. Y., one of the world's largest cordage producers, have announced the appointment of Charles J. Dilke as their representative for rope sales in the San Francisco area. A prominent figure in West Coast marine circles, Dilke was formerly head of C. J. Hendry Company. He will cover the marine, fishing, hardware and industrial fields.

Warehouse stocks of manila rope in sizes from 1/4″ diameter to 9″ circumference will be carried at San Francisco Warehouse Company, 383 Brannan Street, San Francisco.

Charles J. Dilke

Pacific MARINE REVIEW

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Let's Analyze The Ship Supply Status

THE PRESENT LEVEL of business in the shipping industry—all departments—is below par, but it won't stay that way. A thousand ships will continue to be drydocked each year, and will continue to need voyage repairs and the replacement of everything from tumblers to turbines. The tons of paint and miles of rope are but suggestive; dishes number 200,000, and linen 500,000 pieces on one big ship, and the replacement rate is great. By actual count, 265 firms made sales of more than $500 each to a single steamship company in San Francisco this year.

To those who can foresee trends in their industry there are factors of encouragement. An increased freight rate in intercoastal routes (4 percent is expected, to match a 4 percent rise in rail rates) will increase the service, and that means more ships. Some revival in the lumber and coastwise services also means more ships. The coming of new ships to the round-the-world fleet will be a favorable factor. Even the rapidly increasing fleets of foreign lines add a quota of prosperity to the ports they serve. It is estimated that between 10 and 12 percent of the total freight collected by a foreign ship is expended in American ports. Now there is promise of action in the lay-fleet. Certainly next year, and possibly this year, there will be 53 repair jobs on the Pacific Coast averaging $300,000 to put reserve vessels in operating condition for defense, with a possible duplication in each of the following two years. And with a reasonable change in the Merchant Marine Act to permit earlier replacement, shipbuilding would soon be on the upgrade.

It is axiomatic that more trade will mean more ships. As trade increases in the Orient and as financial stability approaches in Europe, there will be need for many more. Cargoes and ships both require financing, they both require insuring, and they both mean business in a big way to ports, shipyards, and the country as a whole.

The Functional Pilot House

By F. J. LLANSO*

AXIOM: *The design of a pilot house should be such that it promotes the over-all safety of the ship by housing sensory instruments and instruments of control in such a manner that their use by the ship's officer is valid, easy and efficient—and of such a design as to endow the ship's officer with the feeling that it is as easy to handle the ship as it would be to handle himself under the existing circumstances.*

ON CONTEMPLATING the functional design of a pilot house it would first seem logical to study the manner in which man moves *himself* safely—unencumbered by having to guide a vehicle which is carrying him —so that those principles of self movement may be used as a guide book around which the pilot house he is to use may be designed.

Moving himself, man develops, through his young, growing years, a conditioned set of reflexes and coordinations which serve him constantly to preserve life and limb in all his conscious moments. The almost unconscious sudden stop in the face of danger calls into play a myriad of reflex nervous and muscular reactions that make the sudden stop *safe*—without these smoothly conditioned reactions the sudden stop in his tracks could make him lose his balance or strain a muscle or even break a bone. A man, turning on his heel to round a corner, does so smoothly, in balance. As he moves, his eyes gauge distance constantly—everyone has had the experience of knowing, instinctively, that his right or perhaps his left foot will have to step over an obstruction several strides before he reaches the obstruction. Aiding his eyesight is his sense of hearing. The sound of his footfalls, in conjunction with the appearance of his footing, telegraph constant messages to his brain, telling of the soundness of the surface he is treading. Through the soles of his feet his sense of feel collaborates to agree or disagree with the findings of his eyes and ears. Even his sense of smell aids when conditions of lighting rob him of the power to see. Then he smells the dankness of wet, perhaps slippery or soft footing or encourages him with the firm smell of dry earth, grass, wood, pavement, etc.

Evolutionists tell us that man ascended from the sea. When he did so, it appears that he abandoned the watery medium forever because, although he has, in his own way, conquered the sea by moving *over* it, he has never tried to swim *through* it as did his finned ancestors. Instead of this he has sought to *walk* over it in the manner he walks over his natural medium, the earth.

But it didn't take more than one or two tries to convince him that he couldn't find sufficient support in water to actually walk upon it. *At this point the first ship was conceived in his mind.* Perhaps a log or a raft . . . *anything that would give him a stable platform to stand on.*

Through succeeding centuries of time man has developed that platform so that it would be as stable as possible (ie: give him the most secure footing), so that he could propel it in the manner he wished and so that he could direct it in the direction that was necessary. But also, as he developed the ship, it became a monster in his hands—a blind, unthinking brute that forced him, the man, to adapt himself to the ship's own mode of movements; denying him the exercise of his shore-trained reflexes and methods of personal motion in the control of the ship that was carrying him.

Out of the fettered years of wind-driven ship man emerged a seeming victor and master of ships when he invented the machine and discovered the power to drive the machine which would drive his ship in the precise manner he wanted. After the discovery of power he sought to use it to energize eyes, ears and the sense of feel for his ship so that the ship itself could accomplish for him, the rider, the same things he himself could do when moving about unhampered by having to direct a vehicle that was carrying him and which he was seeking to direct to his will.

By leaps and bounds, in recent decades, he has indeed devised these mechanical senses for his ship. Truly, they enable his ship to see and hear and feel its way along under his controlling hand and by his scheming brain. But therein lies the joker—he doesn't want the ship to exercise these mechanical senses in its deliberate, unhuman way—man insists in controlling the ship's senses in the manner he would control his own. If instinct tells him to turn or stop, he wants to be able to control his ship precisely as he would control himself. Ir instinct tells him to check his footing, he wants to look down at something that will tell him how much water there is under his ship, as he would look down and see the ground over which he walked. If the visibility decreases, he still wants to see what is ahead and how far it is ahead—radar answers him, but only if the picture is true and so presented to him that the image in the glowing fluorescence can be directly transposed to that which lies ahead or around him. If he thinks another object is near him in fog or in the dark he also wants to hear it, not hear his ship's own noises or any other sounds, but hear only the other object. Through it all underlies a deep-seated instinct of man: his own safety. If he must keep the ship safe to keep himself and his venture safe, then he will always strive to equip his ship in such a manner as to make it as positive to keep it safe—for his own sake—as it is to keep himself safe.

It has already been stated here that a fine set of me-

* Capt. Llanso is Master of American President Lines' Round-the-World C-3 freighter, "President Van Buren."

chanical senses have been devised for the ship. But it usually is not the case that these mechanical senses have been made so available to the man controlling the ship that he can use them to control the ship as he would use his own senses to control his own movements. In a nutshell, the gadgets have arrived but seldom are they available to the ship's officer so that he can use them in a natural, instinctive manner.

To illustrate this belief a set of rules governing location of instruments and the shape of the structure housing them—the pilot house—is suggested below. These rules appear under the related instinctive or conditioned reflex—or both—that man needs to activate his normal reactions in moving himself.

Rule One: Man's sense of orientation is within himself and looking straight ahead. Therefore, man's position of control on board his ship should be in the forward part of the pilot house, and normally looking dead ahead. All sensory and control instruments should be grouped near him at that position.

Rule Two: When moving, man's sight is directed from the horizontal to a direction down in front of him to see his footing. Seldom does he look up. Therefore, all sensory instruments should be placed in a position so that he does not have to turn in his tracks or look above the horizontal and so that these sensory instruments are, as nearly as it is possible to group them, right in front of him. Lacking this, the next rule applies.

Rule Three: To see an object, man's first instinct is to swing his eyes toward it; his second is to swing his head toward it and his third is to turn in position to see it. He will move only far enough to bring the object into his line of sight. He may swing through instincts one, two and three in one smooth motion, as necessary. This rule reiterates the recommendations made in rules one and two.

Rule Four: To hear a sound, man turns his head in the direction of the sound. In doing this, he instinctively registers the sound level in one ear as compared to that of the other ear, and continues moving his head until the sound level, as registered in each ear is approximately equal. He wants to look at the sound in order to identify with his sight what the object is.

Man's conning position in the pilot house has already been fixed by rules one, two and three; therefore, it is necessary to so design the pilot house that extraneous sounds will reach him in their true direction and enable him to evaluate the sounds by using the instinct given above.

Rule Five: Standing alone on his own two feet, when man wants to move an object—which he is resting on the same surface he stands upon—in the same direction as he is facing he pushes with his hands, body, or feet; if he wants to move it behind him, he pulls. Any instrument of control that controls the movement of his ship must be positioned so that it is natural for the man to push, pull, turn or shove it—to get the ship's reaction he expects from the act—when he is standing as dictated in the rules one through four.

Rule Six: A man in normal mental state sees things as they are. When he is deranged he is said to be "seeing things"—ie: not getting a true picture of his surroundings, or seeing things that aren't there.

All sensory instruments must be placed so that the act of transposing what is indicated by them to that which is actually the case will be a true transposition and undistorted in any way.

Rule Seven: Man spends all his life trying instinctively to aid all his other senses in the identification of everything by also feeling any given object to corroborate what his other senses say that object is.

A code of shapes for all control handles, knobs, wheels, etc., should be worked out that most naturally appeal to man as representative of that instrument's identity and of its function. This article won't attempt that much, being content to merely arrange instruments as they are available commercially today.

(Note: The sense of taste and that of smell have been neglected in the devising of counterparts for the purpose of navigation. This sounds far-fetched—but so did radar, twenty years ago.)

Underlying all these rules is an attempt to eliminate all mental hazards of necessary re-orientation; of awkward transposition to the actual case of distorted images seen, or sounds heard by the officer using his ship's sensory instruments; of confusing reversal of arm motions to move control equipment in the right direction. The need for re-orientation as to direction, due to badly positioned chart desk instruments, etc., is often noticeable among the younger officers who have not yet learned to train their reflexes far enough in the absurd direction required by the wrongly positioned items. Older officers eventually overcome this obstacle, but it undoubtedly remains a mental hazard to the day they retire to Snug Harbor.

Before applying these rules to pilot house design it is suggested that a short investigation be made into the abuses that most commonly exist in present day, conventional pilot house design—abuses that contradict the edicts established by the foregoing rules.

Design Abuse One—Insufficient Visibility from Conning Position (Center of Orientation)

Under this heading is included lack of visibility due to too few windows or ports or to badly spaced windows, resulting in large blind sector in directions where visibility is vital. In this connection it may be pointed out that in the conventionally designed pilot house it would be impossible to provide good visibility because the officer is required to move about considerably to cover the various sectors of visibility found necessary and thus no one position will afford him good visibility in all sectors. The answer is: more windows, located so that from the central forward position recommended in rules one, two and three, he can see all that has to be seen. By himself, man swings his windows (his eyes) in the direction he needs.

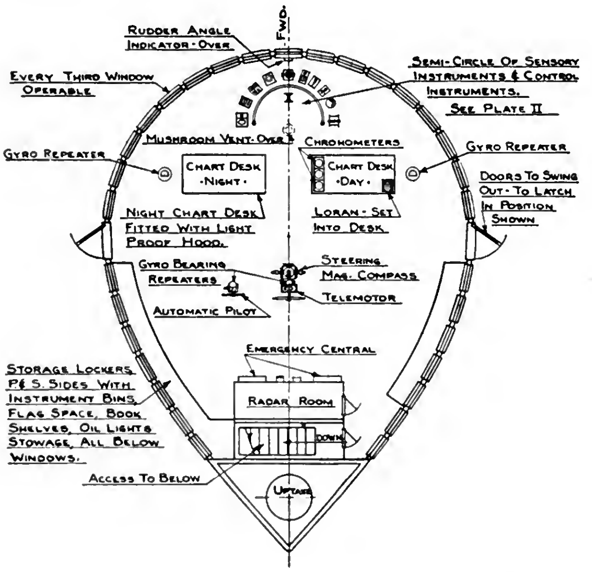
Also under this heading may be included internal disruption of visibility due to reflected light from indicating or warning lights in instruments, light panels, etc. The writer served on one ship which gave all newcomer watch officers a bad fright on their first night watches because a tell-tale power-on red light on a running light switch box, mounted on the after pilot house bulkhead, made each one of them sure he was about to tangle with another ship having the right of way at close quarters. The aforementioned light was,

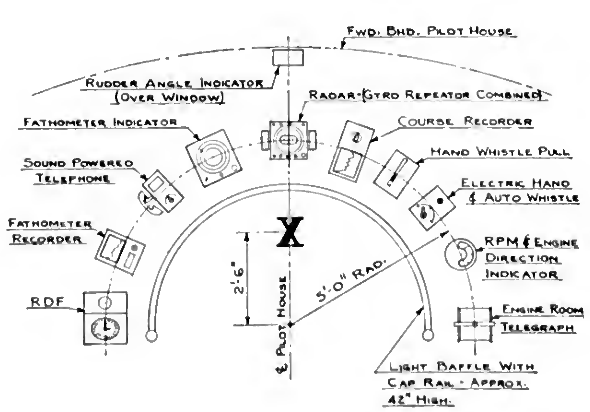
of course, reflected on the pilot house windows. Eventually, the danger was minimized by changing the red light to green, and thereafter the watch officers blithely stood their watches, secure in the knowledge that it was a green light out there in the dark and that our ship had the right of way! The appearance of this green light—always suddenly, when the officer happened to stand just so in any one of about six possible positions — was a shock, all right, but, by comparison with the former red light, a milder one. The answer is: locate all light bearing instruments so that they do not reflect their necessary light on pilot house windows. Place all non-navigating and non-conning instruments with lights on a level below that of the pilot house windows. Shield all other instruments so that their lights do not reflect on pilot house windows.

In close traffic, such as is found in all large harbors and in many smaller, over-congested ports, it oftentimes is necessary to keep a wary eye on traffic ahead while, at the same time, it is prudent to see if anything is coming up astern. In conventionally designed pilot houses this

Top: Plate I—General Arrangement Plan.

Bottom: Plate II—Arrangement of sensory and control instruments.





will frequently make it necessary for the conning officer to leave his central position and wander about hurriedly. When he does that he loses sight of traffic he is approaching and loses much valuable sense of orientation. This is akin to forcing a man to walk down a crowded sidewalk with blinders fitted over his eyes so he can look only in the direction he faces—like denying a man the invaluable use of what is sometimes known as "hundred and eighty degree vision" . . . seeing out of the corner of his eye.

A related common abuse is the following: most seamen agree that the best navigation lookout is accomplished only when the seaman can have a reasonable degree of comfort while performing this duty. A pilot house with insufficient visibility so that it requires the watch stander to stand, eyes wide open, out on a windswept bridge wing in a driving rain will not make a good lookout of that seaman. You can't keep your eyes open in a driving rain, and strong wind makes your eyes run water.

Design Abuse Two—Improper Position of Chart Desk

Chart desks located in remote chartrooms, facing aft, make a comparison of the picture shown there to that seen beyond the ship a tough job. In this position they also take the officer away from his central forward conning position in the pilot house, making him lose his sense of orientation and taking him away from his lookout post. The necessity for a separate chartroom is not apparent to the writer. The chart table should be in the forward part of the pilot house, facing forward—the navigator can look up from his chart and see where he is headed for. Inspection of many pilot houses will reveal small chart and space desks for the use of watch officers—jury rigs placed there by them for their own protection.

Design Abuse Three—Badly Positioned Sensory Instruments

Especially those which give position or direction of the ship or of outside objects and navigational points. A radio direction finder facing athwartships. Radar off the centerline. Fathometer in the chartroom with hurried dashes in and out of the chartrooms to see if there is still enough water under her. When these instruments are badly positioned, the well known expression: "taken leave of his senses" can well be reversed to read: "senses taken leave of him."

Design Abuse Four—Badly Positioned Instruments of Control

Off center steering wheels. When the helmsman is "steadied" on a fixed object in close pilot waters he will actually steer the ship over a curved track due to the parallax involved in keeping an off-center eye on a centerline jackstaff over the object on which he has been "steadied" by the pilot.

Off center compass or gyro steering repeater. The relation of the motion of the ship's bow as it swings in course changes to that of the motion of the swinging compass card is not valid at all and means nothing to the helmsman. They should be integrated by placing the compass on centerline. In this position, the helmsman can look up and down from one to the other. Good helmsmen watch the bow against a cloud or portion of land; when the bow first moves he will begin corrective wheel motion, long before the compass is seen to swing or the repeater

gives its first warning click.

Who has gone to sea that hasn't seen a pilot running about in a pilot house asking — "Mate! Where's the whistle?" If a central conning position is possible in a pilot house, that pilot need not move from where he is—the whistle will be by his hand. By himself, to warn another man of the danger of collision, he would shout: "Hey! Look out!". He would not have to reach for a distant whistle lever.

In a badly designed pilot house—and in many conventionally designed ones, too—a pilot may need to stand out in a wind-blasted wing in order to see properly. He sings out an engine order to the mate standing by the only telegraph inside the pilot house. Result, more often than not: a mistaken order. The mate, in turn, may need to move about considerably inside the pilot house in order to keep a check on those things he is responsible for. Common error: having to stand facing aft, in order to hear the pilot, he puts the engine room telegraph control handle over in a wrong direction. This happens pretty often.

Sketches and Views of the Functionally Designed Pilot House

Plate I shows a plan view of a functional pilot house for which the rules of design have been given in this article.

It becomes apparent at once that the pilot house and chartroom are combined within one structure. A saving in initial cost, it is believed, would be effected for the following reasons: less material and labor for the erection of the structure; centralized wiring leads for electrically operated instruments; utilization of the structure to house the boiler uptake. The curved plate shown in this sketch would perhaps run 10% higher in cost than the straight plate used in rectangular pilot houses. If this last were an objectional feature of contemplated cost of construction, then it may be stated here that a pilot house of diamond shape, with the longer axis fore and aft and constructed of flat plate, would serve the same purpose as the design shown. However, since modern trend is for structures under the pilot house to be curved or even circular—as in deluxe passenger accommodations, sun lounges, observation rooms, etc.—this design of pilot house would tie in well with the structure below and cost less because it follows the same lines.

In Plate I the conining position "X" is shown, surrounded by a semi-circle of sensory and control instruments This feature is almost the whole heart and soul of this article. From position "X" a straight edge through any of the windows shown will reveal the optimum of visibility available to the conning officer. This feature takes unto itself even the refinements of assuring that, when the bridge wing door is secured by a keeper in the open position shown, only the thickness of the door will interfere with visibility in that direction—and also takes the precaution of so placing the gyro bearing repeater that a bearing in that direction will encounter only the thickness of the door. If a straight edge is laid over the center of the gyro bearing repeater and through the various windows, it will become apparent that a bearing dead ahead, four points on the bow, abeam, on the quarter or dead astern, is possible in the clear through a glass window—as are all angles by it or by the repeater on the other side of the pilot house.

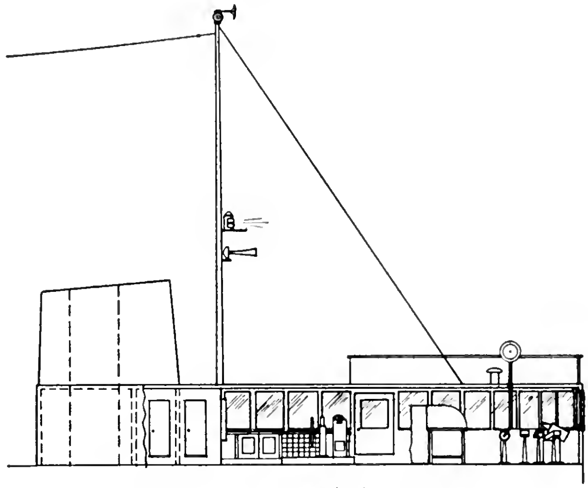


Plate III—Interior view looking to port.

The chart desk arrangement shows a duplication of chart desks. One reason for this is that seldom is one desk big enough to contain all the charts needed or to contain the additional paraphernalia that is used for chart work. But the main reason for the duplication lies in the fact that, since there is no chartroom, one desk must be hooded against light leakage. A hood fitted to this chart desk would serve the purpose. It could be made of sheet metal and hinged to come down out of the way for better visibility over it on day watches, and would be provided with heavy curtains of pullman berth type. This night chart desk is placed to port of the centerline in order to provide unobstructed vision over the non-hooded day chart desk to starboard at night—unimpeded vision on the bow where the "ship that has the right of way" may show up. Both desks face forward—from a glance at the chart the navigator can look up and resume his most important mission: keeping a sharp lookout. Inset into one corner of the day desk is the Loran installation; into the other edge is the chronometer well. The desks are closely located to the gyro bearing repeaters—no forgotten bearings enroute from a distant bridge wing or flying bridge.

Over the conning position is a mushroom vent opening into the pilot house deckhead. This vent is protected from wind-roar noises by a permanent dodger on the flying bridge. Through this vent should be heard many dim whistles which would be lost in the blast of wind through an open window or over a bridge wing dodger.

The only instrument that is positioned above the horizontal level is the Rudder Angle Indicator. It is positioned above the centerline window so that both the conning officer and the helmsman may see it. A duplication, if allowed by cost, would place the conning officer's rudder angle indicator down within the semicircle; the helmsman's in the position as shown.

Along the side of the house, below window level, are storage spaces as shown.

Mounted on the forward face of the Radar Room in the after end of the pilot house are all the contrivances

(Please turn to page 108)

Dredge "Papoose" Gets Digging Ladder Shortened

FINAL step in a two year program to alter the hydraulic suction Dredge *Papoose* from a 20" to a 30" dredge has just been completed at the San Francisco Yard of Bethlehem Stel Company, Shipbuilding Division. The *Papoose,* which is owned by the Hydraulic Dredging Company, Ltd., of Oakland, was built by Bethlehem in 1929. At that time she was an 18" suction dredge.

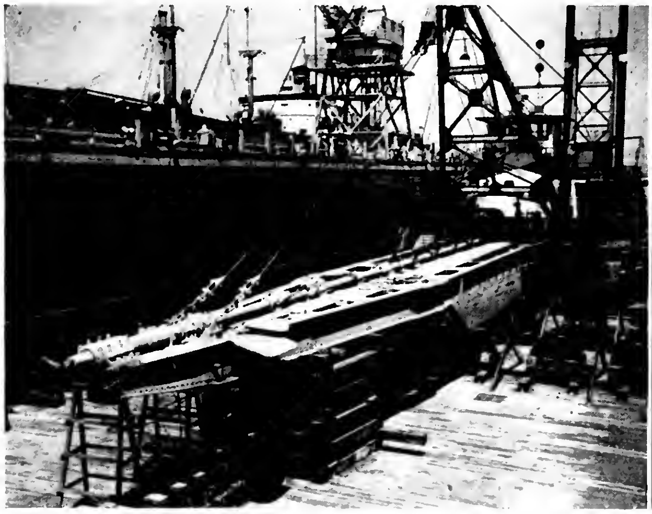
In recent years Bethlehem has performed several major jobs on the *Papoose,* the first in 1944 when her digging laddei was lengthened 50 feet to enable her to dig at the unusual depth of 100 feet. This was accomplished by cutting the ladder apart and inserting a 50 ft. section. In addition, the hull at that time was lengthentd from 96 to 136 feet and five buoyancy tanks were built into the ladder to provide additional lift. Also the A-frame supporting the ladder hoisting tackle was lengthened 15 feet,

Top: On drydock at Bethlehem's San Francisco Yard is the dredge "Papoose" as she looked before her digging ladder was shortened to its original length of 75 ft.

Bottom: Installation of new conical ladderhead.

Top: Forward section of digging ladder being lowered into place for final connection with after section. 50 ft. extension can be seen at lower right.

Bottom: The "Papoose" following completion of alteration work.



because of the increased length of the ladder. After the war, when this section was no longer required, the ladder was shortened again to its original length.

Then, in 1946, when she was preparing to dredge for new berthing facilities at the San Francisco Naval Shipyard, the *Papoose* re-entered the yard to again have the ladder lengthened to 125 feet. This was accomplished by breaking the splice joint between the two sections of the original 75 ft. ladder, after which the 50 foot extension was put into place and all sections then bolted together with splice joints.

In 1947, when the Hydraulic Dredging Company decided to alter the dredge from a 20" to a 30", so as to increase her dredging capacity, Bethlehem's San Francisco Yard was called upon to fabricate a new dredge pump casing for the vessel. This was the largest fabricated dredge pump casing ever constructed by the yard and weighed over 42,000 lbs. It was unique in that it was fabricated rather than cast.

Previous practice had been to use a heavy cast steel pump casing, perhaps as thick as 6" and weighing twice as much, which acted as a strength member and in addition took the abrasive wear from the dredged material. At some indeterminate time the casing would fail, often with disastrous results. The ideal solution of fitting plate liners to take the wear required a square corner on the pump casing, which while not impossible as a cast design is more easily accomplished by fabrication from steel plate. Furthermore, the saving in weight of the fabricated casing is of advantage to the dredge operator from the point of view of cost as well as from that of equipment weight, which affects the freeboard of the dredge. In addition, the operator has a casing of known strength which is easily maintained.

The fabricated pump casing for the *Papoose,* as designed by the Hydraulic Dredge Company, was of the overshot type and was laid out as a modified spiral with a maximum inside diameter, excluding liners, of about 8'9".

During the same overhaul, the yard widened the *Papoose's* hull 7' on each side for the full length of the dredge.

For completion of the final phase of her alteration program the *Papoose* went on drydock at the San Francisco Yard July 25, 1949. She was drydocked with sliding ways built beneath the 50' pontoon ladder extension section, as shown in the photograph. The bolted splice joints were broken and the ladder extension piece slid to one side in the dock.

Then, by means of the sliding ways, the after end of the ladder—or that part which is joined to the dredge—was removed and pulled forward to permit installation of a new bow swivel elbow.

The next step in the process of restoring the ladder to its original length of 75' was to join the forward section with the after section and splice them together.

In the meantime, the forward section of the digging ladder was reconstructed to permit installation of a fabricated steel ladder head (the conical shaped end piece show in the photograph number 2). When this phase of the operation was complete, a new 34" elliptical suction pipe was installed within the ladder from the ladder head to the after end of the ladder. This pipe, together with all cast fittings, was made especially for this job in the Yard's shops. The swivel elbow and suction pipe within the hull of the dredge were then installed and the reassembled digging ladder slid back on the ways into position and reconnected to the dredge.

While this work was in progress the cutter shafting and reduction gears were dismantled and new roller bearings were installed . A new cutter tailshaft, thrust bearing and couplings were also made up and the shafting and gears reinstalled.

A Westinghouse 700 H.P. electric cutter drive motor complete with blower was also installed, together with a new 10-ton six-bladed, seven foot diameter cutter head designed by the Hydraulic Dredging Company.

The dredge is now successfully operating on a contract for straightening and deepening the Napa River.

Bethlehem's San Francisco yard has built 83 dredges, including the first successful gold dredge in America in 1897, and has been repairing and providing replacement parts for all types of dredges ever since.

Study of Ocean Floor

The first thorough study of the sea bottom off the coast of central California will be undertaken during the next year by the California Academy of Sciences in cooperation with the Navy.

The five-man scientific team from the Academy will be quartered aboard the net tender U.S.S. *Mulberry* during the exploratory trips. In addition, the Navy is to supply wire line, trawl buckets, and winches necessary for the study. Total cost to the Navy is $14,000.

The contract with the Navy is in accordance with the Naval Research policy of "farming out" basic research projects to universities and scientific institutions throughout the nation.

Generally, the objectives of the project are to determine the geological character of the continental shelf; to study the occurence and distribution of undersea life in relation to such factors as temperature and depth, and to interpret the effect of bottom contours upon local currents and the upwelling of water from the ocean depths.

Evaluation of the study is expected to yield such practical information as the possible existence of food and mineral resources on the continental shelf.

Explanation of the character of the Farallone Islands and San Andreas fault is foreseen as a by-product of the Academy research. There is no existing literature on the nature of the Farallones except two brief, conflicting statements—one by a botanist and one by an ornithologist. Sketchy information on the San Andreas fault indicates that it may form one of the greatest submarine cliffs known.

Although the study is expected to continue until the summer of 1950, the scientists will make the most of their exploratory voyages aboard the *Mulberry* within the next three months.

Pacific Coast Ports and The Panama Canal

EDITOR'S NOTE: The Pacific American Steamship Association has prepared a pamphlet explaining the problem of Panama Canal tolls as they affect intercoastal shipping. The pamphlet is published here with the addition of proceedings subsequent to its issuance by the association.

Panama Canal tolls, as shown in the chart on the next page, have an important bearing on Pacific Coast port activities, especially in the burden they place on eastbound cargoes. They also have an important bearing on the economy of the Pacific Coast as reflected in manufacturing and construction costs in the West. For instance, shipbuilding in the West is substantially affected by westbound freight rates and a Panama Canal toll of seven or eight thousand dollars per cargo is an important part of the cost of steel and other equipment used in shipyards. Criticism of construction subsidies and West Coast differentials should not be accepted, for the government is collecting enormous sums from day to day for a fictitiously priced service which adds to freight costs, in spiraling amounts.

The whole canal toll set-up is wrong, and the Pacific American Steamship Association is contributing greatly to the welfore of the industry by clarifying the problem.

THE Panama Canal was built mainly to fulfill our military necessity for a two-ocean navy. An additional purpose was to supply a convenience to commercial shipping.

The Canal's service in two world wars vindicated those who fought for its construction as a national defense utility. And it has served world commerce well, as a shorter route between our coastal areas and between the continents of the world.

But the financial burden of maintaining a means of transfer of our naval power from one ocean area to another has been borne by commercial shipping. This arises out of the present method of computing tolls on commercial ships transiting the Canal.

And Pacific Coast ports, 64% of whose cargoes are subject to Canal tolls, have been carrying proportionately the lion's share of this burden.

Questions and answers about the Panama Canal ....

1 WHO OWNS THE PANAMA CANAL?

The United States Government, who finished it in 1914.

2 WHY WAS IT BUILT?

For national defense purposes, mainly—so that the United States could use her Navy in both the Pacific and Atlantic Oceans. Naturally, its commercial value was fully recognized also.

President Theodore Roosevelt, in his message to Congress January 4, 1904, said that the Canal had been "long acknowledged to be essential to commercial development," and "has become . . . more than ever essential to our national defense . . . Reasons of convenience have been superseded by reasons of vital necessity."

General George W. Goethals, the man who built the Canal and was the first Civil Governor of the Canal Zone:

". . . I naturally take the military point of view that it is for the use of the fleet. I have always felt that the cost of building the Canal should be charged off the books as against the military defense of the Union." (Testimony to Senate Committee, 1911.)

Colonel Harry Burgess, 1928 Canal Zone Governor and former Panama Canal Railroad President:

. . . It seems improbable that the U. S. would have decided on the construction of the Canal solely for commercial consideration. The deciding factor was the value of the Canal as an element of National Defense." (Article in "Military Engineer," July-August, 1929.)

3 WHO PAID FOR IT?

Uncle Sam paid the initial cost of construction and has paid for capital improvements (widening channels—more locks—etc.).

4 WHO USES IT?

Commercial and Government ships of all maritime nations. By treaty, all nations pay the same toll rates.

5 WHERE HAS THE MONEY COME FROM TO RUN THE CANAL?

From three sources:

Tolls on commercial ships . . .	$574,807,937	
Civil revenues .	7,227,925	
Business profits .	26,980,571	
Total since 1914 .	$609,106,433	$609 million

6 HOW HAS THIS INCOME BEEN USED?

To pay expenses for these items:

a—Commercial ship transits b—Toll-free Government ship transits c—U. S. Government activities	Total since 1914 $335 million SURPLUS— $274 million

In addition, the Canal, since 1920, has charged 3% "interest" on all funds used to build and improve the Canal.

This has amounted to— $425 million
"DEFICIT"— $151 million

7 WHAT ARE THESE VARIOUS EXPENSE ITEMS?

Commercial ship transits covers the cost of providing passage for commercial shipping.

Toll-free Government ship transits represents the cost of providing passage for Government ships of the United States, which pay no tolls.

U. S. civil government and semi-military activities consist of numerous Government functions at the Canal, many of which have no connection with furnishing passage through the Canal for commercial ships. Some of the activities are related only partially to commercial ship transits.

Some of the civil functions of the U. S. Government at the Canal are: Hospitals, schools, recreational installations, courthouses, roads, sewage systems, street lighting, prisons and post offices.

8 WHAT IS THIS "INTEREST"?

It is simply a bookkeeping procedure at the Panama Canal. The U. S. Treasury doesn't bill the Canal for interest, and the Panama Canal doesn't pay any interest to the Treasury. The so-called "interest" exists only on the books of the Canal, yet is used as a cost factor in calculating toll rates.

9 THEN ISN'T COMMERCIAL SHIPPING PAYING FOR UNRELATED GOVERNMENT EXPENSES?

Yes. Through tolls, commercial shipping has paid not only all of its own expenses and all civil government expenses, but has provided a surplus of $274 million. This surplus is wiped out by the bookkeeping "interest" charges.

10 HOW ABOUT OTHER U. S. BUILT CANALS? ARE TOLLS CHARGED? DOES THE GOVERNMENT CHARGE ITSELF "INTEREST"?

The U. S. Government has built 12 other major canals, providing over 1,750 miles of waterways. Neither tolls nor interest is charged on any of these canals.

(Canals are: Cape Cod, Black Rock, Chesapeake, Del-Rehoboth Bays, Florida Intercoastal Waterway, Florida Waterway, Gulf Intercoastal Waterway, Illinois Waterway, Illinois and Mississippi, Dalles-Celilo, Lake Washington and the Soo.)

11 HOW MUCH DOES IT COST TO SEND A SHIP THROUGH THE PANAMA CANAL?

About $7,000 for a "C-3" type ship, a freighter in common use today.

For intercoastal ships, this would be $14,000 for a round trip voyage, which amount is roughly equal to the entire crew's wages for a month's period.

To illustrate the importance of these tolls to intercoastal operators, this group of carriers lost $4 million between 1935 and 1939, during which period they paid $25 million in Canal tolls.

12 HOW IS THE AMOUNT OF TOLL ARRIVED AT?

Tolls are assessed at the rate of 90c per vessel ton. The President in March of 1948 ordered the rate increased to $1.00, but suspended the Order pending a congressional investigation of the financial operations of the Canal.

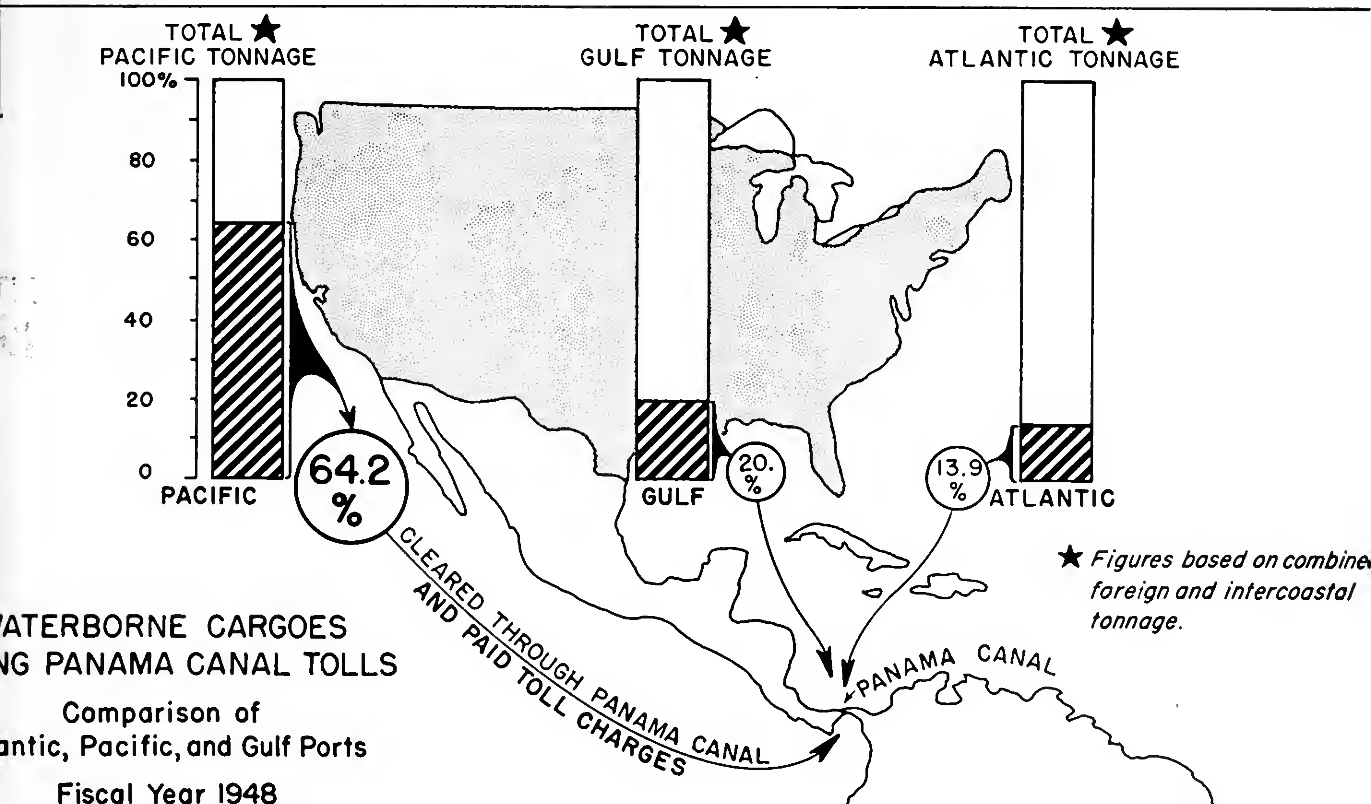
13 WHAT WOULD BE A PROPER TOLL RATE FOR COMMERCIAL SHIPPING?

The industry does not presume to set a rate. That's the job of the Government, through proper rate-making machinery.

14 WHAT DOES THE SHIPPING INDUSTRY RECOMMEND?

That there be charged to commercial shipping

(Please turn to page 106)



"Empire Marshal" at pier.

Complicated Turbine Repair At Todd's Los Angeles Yard

MAJOR REPAIRS to the propulsion machinery of the *Empire Marshal* have been completed by the Los Angeles Division of the Todd Shipyards Corporation. The 451-foot vessel was specially built and fitted for transporting railroad equipment, and is operated by Pandelis Shipping Company, Ltd., London, England, whose local agent is Guy Barham Company, San Pedro, California.

The *Empire Marshal* turbo-electric machinery was damaged in an explosion July 28, 1948, while at anchorage in Los Angeles Harbor during her voyage between Vancouver, B. C., and Buenos Aires.

Specifications for removals and examination were prepared and Todd was the successful bidder.

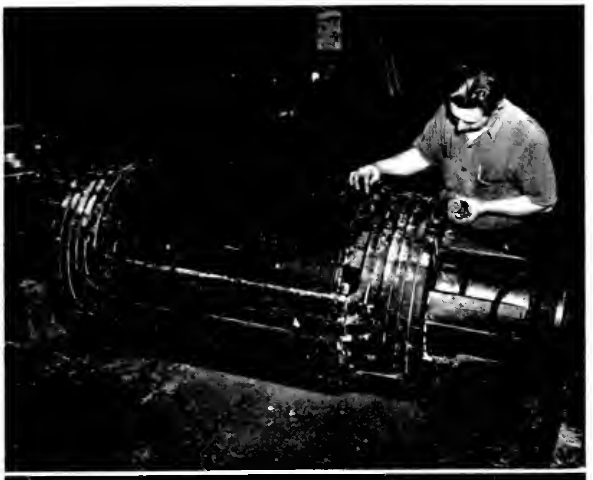
Dismantling operations for the primary contract were started on August 5, 1948, and subsequent repairs were negotiated with Todd. Necessary removals, such as the engine room skylight, ladders, gratings, valves, piping and electrical equipment were made for the removal of the main alternator and turbine rotors to the shop for truth tests and fracture tests by magnaflux. The conducted tests and examinations proved the inability to use the existing rotors, and specifications were written for their renewal, as well as the alternator stator. In addition, the damaged auxiliary generator and switchboard, together with their associated equipment, were disassembled and new parts and materials installed.

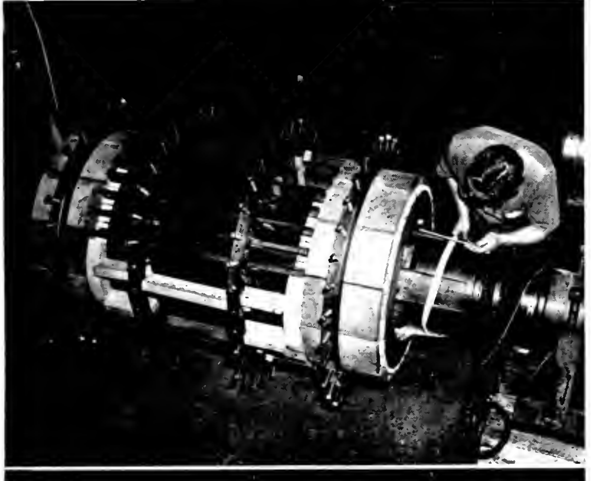
Technical information and drawings were required prior to initiating any replacements, and contacts were established with the original builders in England, to supply the necessary information.

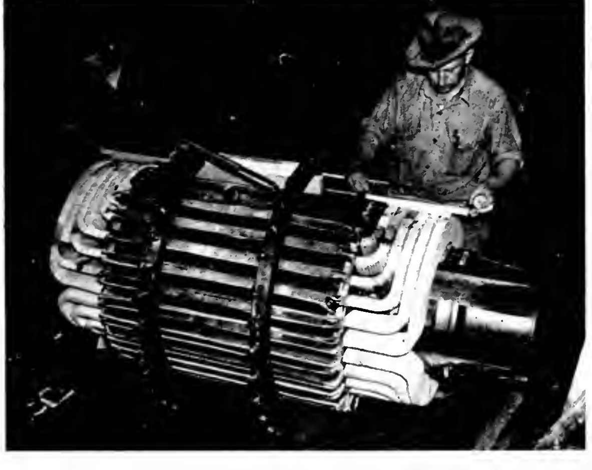
Intricate design, availability of patterns, special materials and finished parts favored replacements to be made from abroad; however, their supply was limited due to a backlog of orders, and arrangements were made to produce the unavailable parts in this country.

New carbon steel forgings, conforming to British Engineering Standards Association, and Lloyds Inspection, were procured from Isaacson Iron Works, Seattle, Washington, for the main turbine and alternator, the largest of which were the rotors weighing three tons for the turbine (10′3″ long x 13¾″ dia.) and six tons for the alternator (13′6½″ long x 32½″ dia.). The rotors were rough machined and heat treated in accordance with Classification requirements and manufacturer's specifications, prior to shipment from Seattle.

After the machining of the turbine rotor shaft and installation of the turbine wheels were finished, the as-







sembly was checked for truth and dynamically balanced.

The alternator rotor assembly required a longer time to complete due to its sequence of operations. When the forging was finished machined, all locking keys for the windings were installed and the rotor was dynamically balanced. It was then sent by Todd to General Electric Company in Los Angeles whose shop facilities were available for stacking of the laminations, in accordance with the builders drawings and specifications. The dies and sequence for punching the lamination segments for alternator rotor and stator were procured from England by Todd Shipyards Corporation and forwarded to General Electric Company of Los Angeles. After the completion of the stacking, the rotor was returned for the fitting of the keys and couplings. The assembly was then crated and shipped to Westinghouse Electric Company, Sunnyvale, Cal., for its overspeed test and final balancing. Upon its return the alternator rotor was ready for installation in the vessel.

Upon receipt of the alternator stator coils from England, General Electric Company of Los Angeles completed the electrical installation of the stator and performed the necessary tests.

The main turbine cases were thoroughly cleaned, steam and oil flanges scraped, new packing fitted, studs and casing bolts renewed before the rotor was lowered into place. In addition, the forward and after journal bearings and thrust bearing were reinstalled with new castings and parts.

The new main alternator assembly consisting of stator shell, rotor, pedestal, and bearings was installed with the proper fits and clearances, and reconnected to the main switchboard and main rotor. Alignment of the new alternator to the main turbine was checked by gauge readings and all clearances were made to conform to the builders requirements.

Damage from scattered pieces of metal required considerable renewal of insulation on piping and engine room casing, and upon completion the engine room and casing were cleaned and painted.

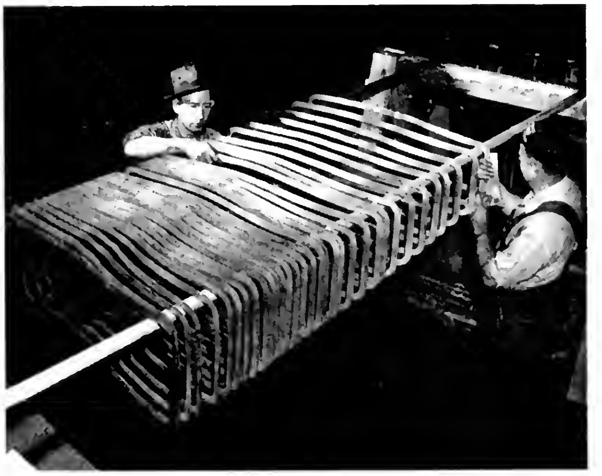
All repairs were accomplished under the supervision of the owners representative, George Dupuy of Frank

Top: View of the main turbine generator field rotor as removed from the vessel.

Center: Preparing main turbine generator for rewinding.

ottom: Main generator rotor with reinsulated coils in place.

Opposite: Preparing main generator field copper for reinsulation.



Dupuy and Sons. The new work complied with Lloyds Classification.

Minor voyage repairs and owner's betterments were completed while the major repairs were in progress.

Prior to trials, the growth on the hull was examined by a diver, and a favorable report was received, permitting the calculated speeds to be attained during the successful sea trial conducted August 2, 1949.

General Electric and Westinghouse shared the servicing on the "Empire Marshal." On this page and the preceding page are shown pictures taken in General Electric's shop in Los Angeles. Pictures shown on the opposite page were taken in the Westinghouse plant at Sunnyvale.

Top: Brazing end connections during rewinding of the main turbine generator stator.

Bottom: Lashings of end connections of the stator windings on the main propulsion turbine generator.

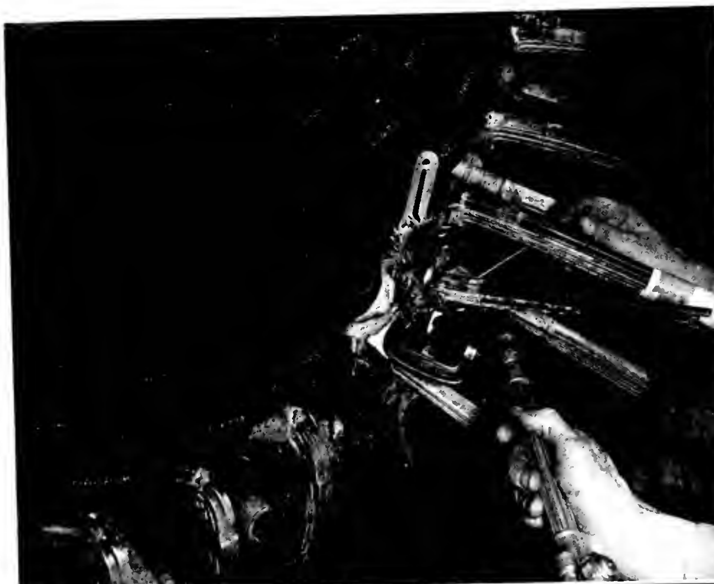
CAPTIONS FOR PICTURES ON OPPOSITE PAGE ▶

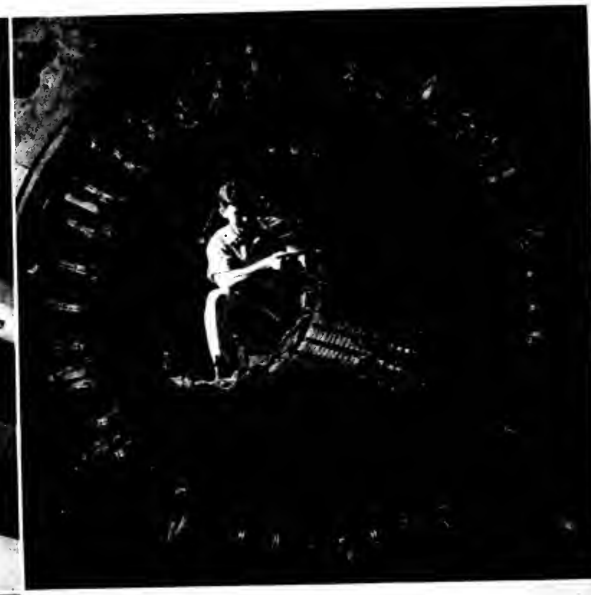
Top: An overspeed test on the main generator rotor: This is an important final step which ensures the proper performance of the unit. During this test, the rotor is spun at 3560 revolutions per minute—20 per cent more than its rated speed. This picture was taken before the rotor was spun. During the actual spinning, a heavy protective shield, made of one and a half inch steel, which may be seen behind rotor, is placed over the apparatus. Power for turning is provided by the high speed test turbine at left. This picture was taken on the turbine test stage of Building 41, at Westinghouse Electric's Sunnyvale, Calif., plant.

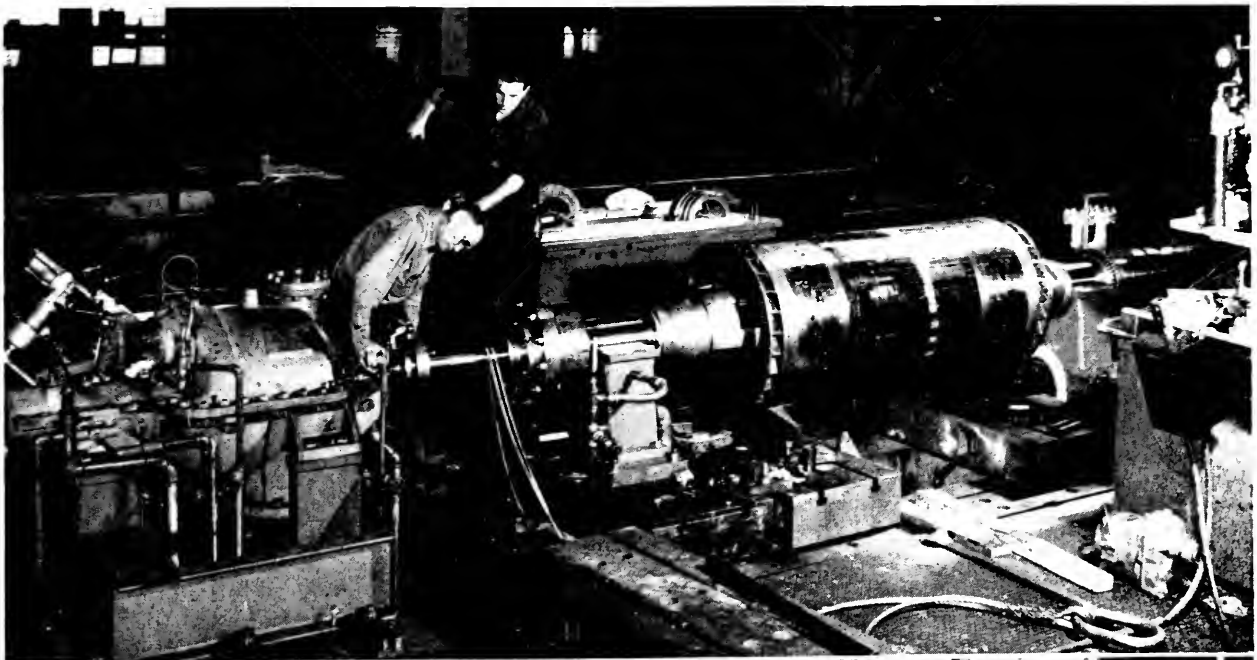
Bottom: Balancing the big rotor was a delicate job. Technicians at the Sunnyvale plant of Westinghouse made careful adjustments to make sure that the unit will turn smoothly at high speed. The rotor is part of an 8,000 KW generator weighing about ten tons.

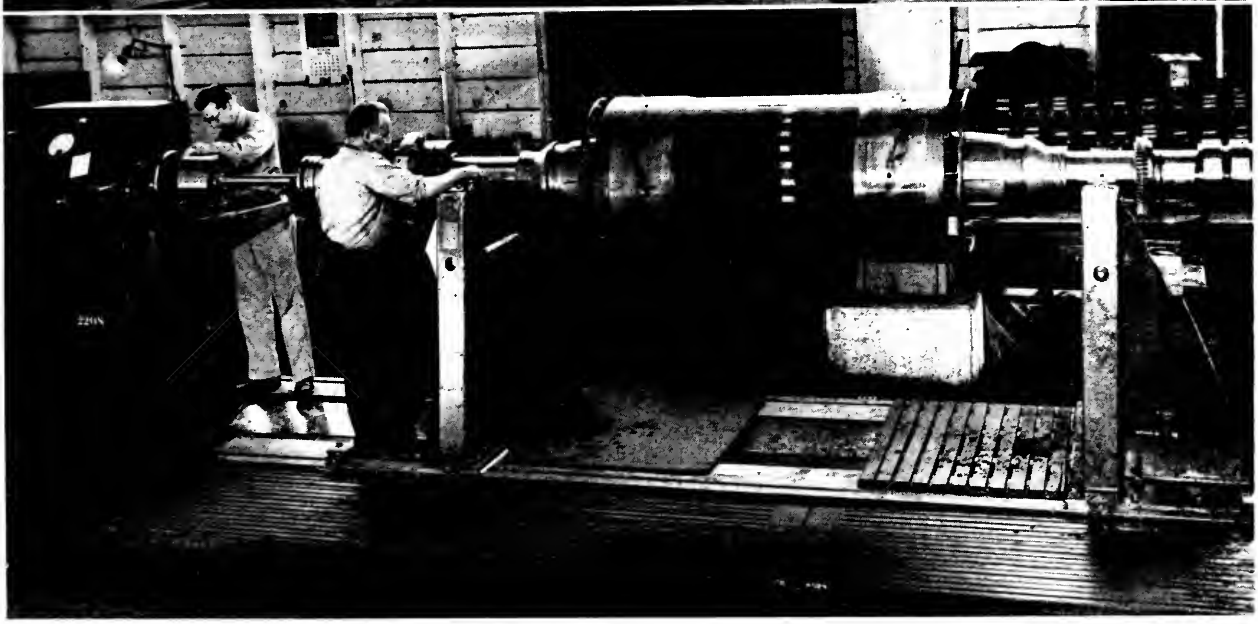
Top: Turbine generator stator being rewound.

Bottom: Loading rewound turbine generator stator for delivery to Todd Shipyards.







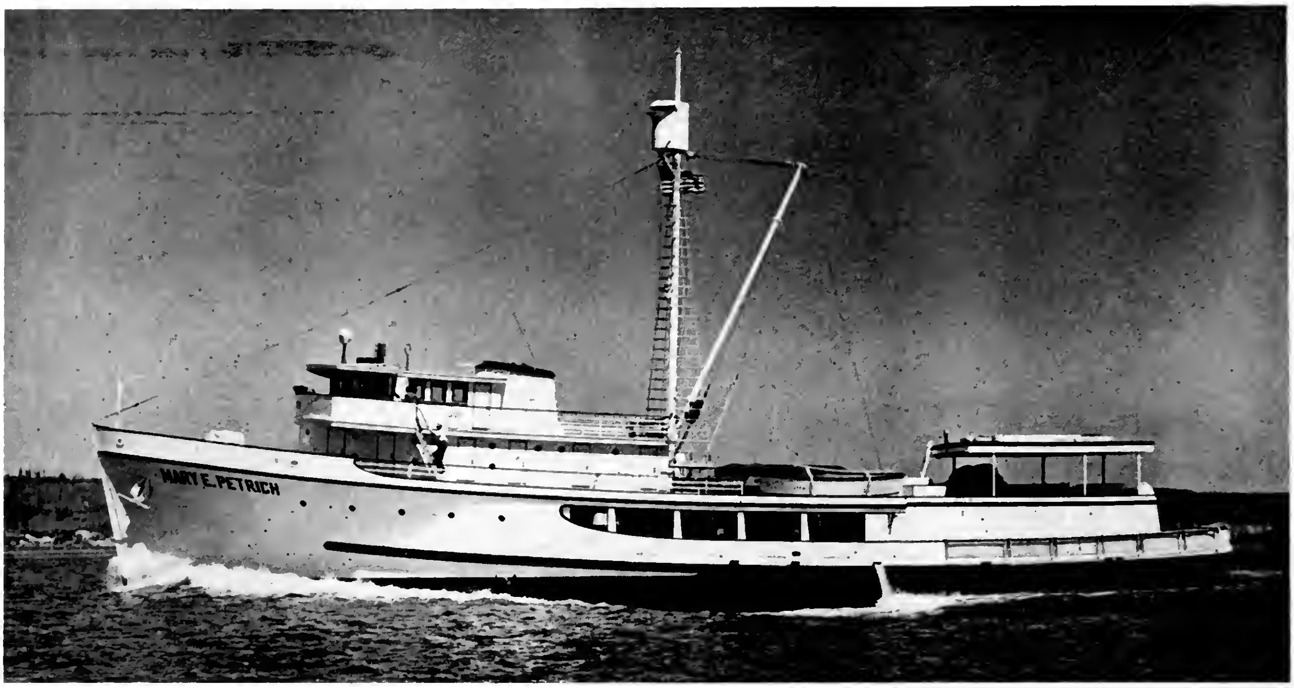


Oriental Cruise for "Golden Bear"

The California Maritime Academy Training Ship *Golden Bear* will visit oriental ports on its 1950 training cruise if international conditions permit, announced Commodore Russell M. Ihrig, Superintendent of the Academy. The sleek white training ship, which made the memorable good-will cruise to the Mediterranean with relief supplies contributed by the citizens of California, in 1948, is tentatively scheduled to leave San Francisco on February 15 and visit Hilo, Honolulu, Guam, Manila, Hongkong and Yokohama, with stops of several days at each port.

The cruise will cover approximately 14,000 miles, returning to San Francisco on May 9. The 1949 cruise, completed in May, visited Mexico, Panama, Peru and Chile.

The *Golden Bear* is operated and maintained by the officers and students of the State Academy, the latter being in training for licensed officers of the Merchant Marine.



The "Mary E. Petrich" — Largest Tuna Clipper

PLANNING and building a tuna clipper is, in almost every case a pioneering venture. Western Boat Building Company of Tacoma has come up with the largest and fastest, and the company as well as its member-architect has proved itself again to be a pioneer. The builder, the boat itself, and the power plant of the *Mary E. Petrich* have made good. Design characteristics were:

Length overall	150′
Length between perpend.	140′
Beam over plank	34′
Depth	16′
Gross Tons	509.44
Net Tons	263.11
Official No.	258201
Speed Full Load	13¾ knots

Accommodations for 20 men

Capacity:
450 Tons Tuna Fish Cargo
68,000 Gal. Fuel Oil
2,000 Gal. Lube Oil
5,000 Gal. Fresh Water
500 Gal. Gasoline

Main Engine—1600 HP at 720 RPM
With Hydraulic Coupling and 3 to 1 Reduction Gear

Full Speed	13¾ Knots
Cruising Speed	13 Knots
Cruising Range	20,000 Miles

Generator Capacity at 440 v.
2—142 KW Generators
1— 60 KW Generator

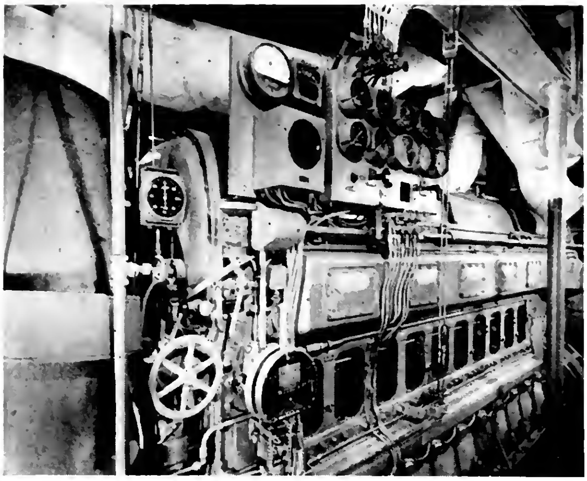
Wood Hull—7″ Flitches on 24″ Center 2¾″ Plank
All Steel Fish Wells
W.P. Plywood Deck Boxes
Aluminum Stack
Aluminum Crows Nest
Mahogany Trim in Quarters
Value—$600,000.00 Approx.

On the "shake-down" trip the average speed was 14.1 knots. With a top average of 14.6 knots, she departed on her maiden fishing voyage to Central and South American waters on July 26 under the command of Capt. Joe Alves.

* * *

This vessel is owned entirely by the Western Boat Building Company of Tacoma, of which Martin A. Petrich and his five sons are the owners. The vessel will join the other eight fishing vessels owned in whole or in part by the company. They consist of both purse seiners and clippers, and are *Sherry Ann, Clipper, Western Clipper, Dolores M., Western Monarch, Western Fisher, Western Explorer* and *St. Francis.* Each vessel has a Panama Canal Certificate which will enable it to deliver catches either to the West Coast or to the Gulf and Eastern Seaboard.

The *Mary E. Petrich* was completely designed by James F. Petrich, naval architect of the firm, and the sponsor was Mrs. James F. Petrich, wife of the designer,



Main engine. Fairbanks Morse Model 38, 1600 HP at 720 rpm.

on March 15, 1949. Jim Petrich's unique paper on tuna boats before the Society of Naval Architects and Marine Engineers will be published in this magazine, beginning in this issue.

The Petrich firm has built and operated fishing vessels for the last 33 years. They have operated from Alaska to South America, and in 1938 this firm operated the purse seiner, *Western Explorer,* out of Gloucester, Mass. Preparations are now being made to set up operations out of Pascagoula, Mississippi.

Other operations consist of the building and selling of stock cruisers, runabouts and tuna tenders, known as *Fairliners.*

The main engine of the *Mary E. Petrich* is a Fairbanks Morse Model 38 opposed piston diesel, rated 1600 HP at 720 rpm. The Fairbanks Morse opposed piston engine is particularly suitable for tuna vessel service as its compact design and low weight make it possible to install the engine well forward in the bow of the vessel without making the vessel bow heavy. The 1600 hp engine weighs only approximately 38,000 lbs., or only about ⅓ of the weight of the heavier slow speed models. This, in turn, makes it posible to give the bow a finer line as less buoyancy is required to support the lighter weight.

This advantage is clearly indicated in the speed tests. Although this is the largest tuna boat ever built, the vessel is also one of the fastest. With the engine turning only at 600 rpm instead of full 720 rpm, the vessel maintained better than 12 knots. This in itself indicates the excellent design of the hull and is a credit not only to the engine, but also to the designers and builders.

A Pacific-Western Model 6225 reduction gear with 3 to 1 ratio is installed in the aft end of the shaft alley, giving a propeller speed of approximately 240 rpm. The propeller is a Coolidge manganese bronze 3 blade type, 107″ in diameter by 82″ pitch.

A drive from the engine to the reduction gear is through an American Blower Company hydraulic coupling, mounted immediately aft of the engine, and then through an intermediate shaft between the engine and reduction gear 5¾″ in diameter and approximately 55′ in length. The hydraulic coupling eliminates practically all torsional vibration and gives smooth delivery of power to the propeller shaft system. The tail shaft after the reduction gear is 8¾″ in diameter and approximately 24′ in length. With the arrangement of the reduction gear in the aft end of the shaft alley considerable weight in shafting is saved.

The two main generator sets are Fairbanks Morse Model 31A6¼, 210 hp, 142 kw, 2 cycle units operating at 720 rpm. The engines are 6 cylinder, 6¼″ bore, 9″ stroke units and drive Fairbanks Morse type TGZJM marine drip-proof, 40 degree rated, 3 phase, 60 cycle, 480 volt alternators with top mounted V-belt driven exciters.

Many of the design features follow closely the construction of the opposed piston engine. The engine has completely oil-jacketed pistons in which both the piston crown and the entire length of the skirt is oil-cooled. The engine is of en-bloc construction with removable cylinder liners of unusual construction. Like the OP engine, the cylinders have integral water jackets, making a one piece casting of the jacket and the liner. There are no rubber water seals, or other joints between the liner and frame. It is impossible for water to leak into the crankcase from the water jacket, and corrosion between the jacket and frame is entirely eliminated. All water inlet connections are by means of screwed and threaded fittings with a dry block.

All main bearings, crankshaft bearings, camshaft bearings and wrist pin bearings are precision type. The main and connecting rod bearings are of identical construction and are completely interchangeable, using pre-

The "Mary E. Petrich" making 13 knots on trial run.

cision aluminum alloy liners. All of the bearings, even the wrist pin bearings, can be replaced without scraping or fitting.

All of the Fairbanks Morse electrical equipment including not only the engine generators, but also all of the motors are of special marine drip-proof construction with non-corrosive fittings, and are 40 degree rated with 25% overload capacity for two hours at 55 degrees. This provides an ample safe margin for the extremely warm operating condition in the tropics where the tuna boats usually operate.

Fairbanks Morse motors and pumps are used throughout the vessel. Each of the 14 wells is fitted with a 4", 7½ hp, Fig. 6720-V combination bait and brine pump with Fairbanks Morse type QZFK ball bearing motor, having capacity of approximately 800 gpm. Another 3", Fig. 6720-V with a 5 hp, tye QZFK motor serves as a bilge pump. For fire pump service, a Fairbanks Morse Fig. 5553, 1½", 5 hp, builtogether pump will deliver 150 gpm at a 150 ft. head.

Two Fairbanks Morse Model 625-M-30 water pressure systems with ½ hp motors provide water under pressure for fresh water service and for sanitary purposes.

Other Fairbanks Morse electrical equipment includes a 60 kw, 1200 rpm, type TGZK, 3 phase, 480 volt alternator with direct-connected exciter, which is driven by a General Motors Model 671.

Direct current for the steering engine load is provided by a Fairbanks Morse 7½ hp, 5 kw, type DGQZU, vertical motor generator set, developing 125 volt direct current.

The four Baker size 9A, 6¼ x 6¼, 2 cylinder ammonia compressors are each driven by Fairbanks Morse 30 hp, 1800 rpm, type QZK motors with V-belt drive. It is interesting to note that the standard Fairbanks Morse general purpose QZK motor is used instead of the usual high torque motor. The characteristics of this general purpose motor with copper spun rotor are such that the general purpose motor does many of the jobs usually requiring special high torque motors.

The galley refrigeration compressor is driven by a Fairbanks Morse 3 hp QZK motor, and the two Quincy air compressors are driven with 7½ hp Fairbanks Morse type QZK motors.

All of the pumps are fitted with bronze impellers and Monel shafts. All of the motors are especially insulated to withstand tropical moisture conditions.

Discussion of the equipment on the "May E. Petrich" will be continued in October parallaling the James Petrich paper on tuna boats and tuna fishing.—Ed.

The Tuna Clipper

By JAMES F. PETRICH

THE MODERN High Seas Live Bait Boat, or "Tuna Clipper", is a large fishing vessel 90 to 150 feet long capable of carrying 100 to 500 tons of frozen tuna. She is built of wood or steel, has a raised deck forward and large deck boxes aft. Her most distinguishing feature is her extremely low freeboard, her main deck aft being practically awash at all times.

The hull below the main deck is divided into machinery space and tanks. Her engine room is well forward, just aft of a large bow fuel oil tank, and leading from it all the way aft to the Lazarette is a spacious shaft alley. The 8 to 14 watertight and refrigerated cargo wells, and the aft fuel oil and fresh water tanks, are on either side of the shaft alley. In the forecastle head forward below the raised deck there is storage space and more machinery space. Amidships is the galley and aft on the open main deck are three deck boxes, refrigerated and water-tight, and used for carrying live bait or frozen tuna cargo. The quarters for ten to twenty men are located in the deck house which is forward on the raised dack. Above the deck house is the pilot house and chart room. Usually there is but a single mast and boom located amidships which is used to lift the motor-boat and seine skiffs carried there.

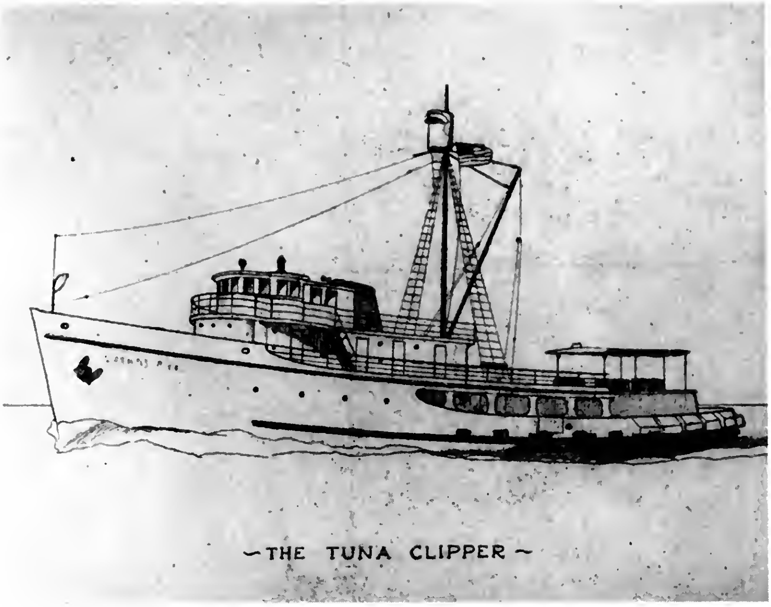
From her home port of San Diego or San Pedro the Tuna Clipper travels 2500 miles to the waters off Central America or to the Gala-

Allen Petrich, James Petrich, Martin Petrich, Sr., and Capt. Joe Alves on their new tuna clipper.

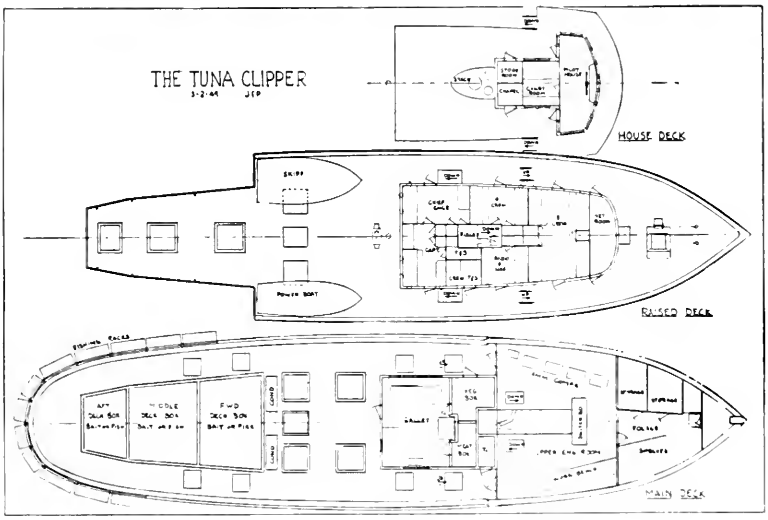
pagos Islands of Peru. She is provisioned for a three or four month trip and carries the fuel needed for the long trip in her cargo wells as well as her permanent fuel tanks. The deck boxes and most of the remaining wells carry live bait, small fish caught off Mexico or near the tuna grounds and kept alive by constantly circulating sea water to them. As the bait and fuel are used at the fishing grounds, they are replaced in the wells and boxes by the tuna fish caught, so that the Tuna Clipper always in a heavily loaded condition from the time she starts out until she returns home with a full load of frozen tuna.

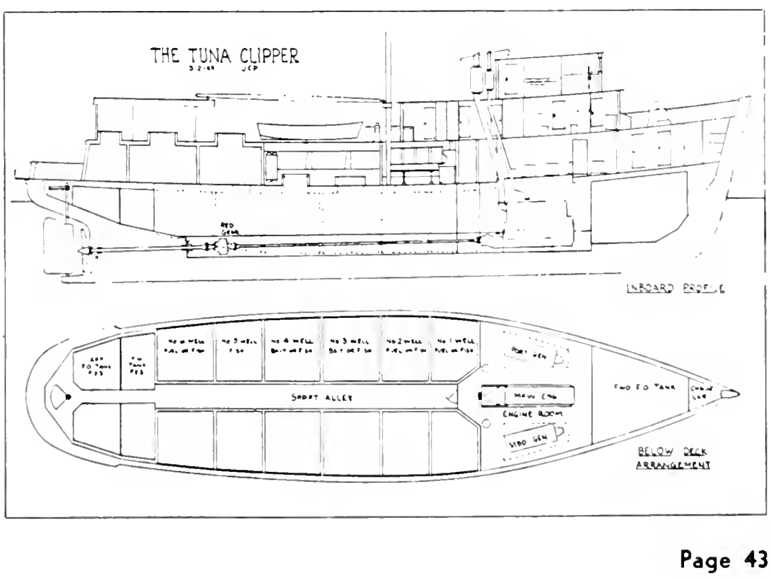
At the present time there are well over 200 large Tuna Clippers in the fishing fleet. This is a spectacular expansion since the start of the

(Please turn to page 114)



The architect's drawings of the tuna clipper and the deck and profile arrangements shown in the adjoining column are referred to in the accompanying paper by James Petrich. They will be referred to from time to time in later installments of the paper.





The picture below shows the deck piled with tuna. These fish must be transferred to the deck boxes to provide space for the landing of additional fish.

Salvaged Apparatus on "A. Mackenzie"

By E. H. HAUSLER
Electrical Service Supervisor
Westinghouse Electric Corp., San Francisco

IN the rehabilitation of the U. S. Corps of Engineers' hopper dredge, "A. Mackenzie," two of the largest and most important pieces of apparatus—the 800-horsepower electric dredge pump motor and the switchgear—were salvaged.

Their subsequent re-building, into a "better-than-new" condition, attests the soundness of the design changes which were incorporated into the work on the 25 year old vessel.

The motor, which had been completely submerged in salt water as a result of flooding of the forward engine room at Okinawa during the big 1945 typhoon, was in very bad condition when it was delivered to the Emeryville, Calif., Manufacturing and Repair Shop of Westinghouse Electric Corporation. The housings were covered with rust and barnacles, the rotor was corroded, and all the windings were completely ruined.

Although the switchgear had not been on the damaged dredge, it was in thoroughly "beat-up" condition as a result of long and hard service on another vessel during the war. It was necessary to re-wire the switchgear completely, involving new circuits, dials, handles and meters, literally re-building from the floor up.

Both motor and switchgear were delivered to the Emeryville shop in "bits and pieces." The accompanying pictures show portions of the apparatus as received, various phases of the repair work, and the completed units.

As a result of design changes incorporated in the re-building job, the motor has been up-rated to 900 H.P. — 100 more than formerly. Likewise, the switchgear as currently used in the dredge involves much more apparatus. Because of the unusual amount of maneuvering a hopper dredge must do, its control necessarily includes additional features which enable the master to have direct control from the bridge at all times.

The Paint Job

The bottom paint applied to the *Mackenzie* was Navy Plastic Anti-corrosive #14 and Navy Cold Plastic Anti-fouling #143, manufactured by American Marine Paint Company. Tnemec paint, furnished by Joseph Gisler, was used as a primer above the deep load line and also in the interior. Devoe Finish paint, furnished by Weeks-Howe-Emerson, was used topside above the deepload line and also in the interior.

PICTURES ON OPPOSITE PAGE ▶

1. Some idea of the condition in which the "Mackenzie's" 800-horse-power driven pump motor arrived at Westinghouse Electric's Emeryville, Calif., plant is indicated in this picture. Shown here is a portion of an end bell. Two workers are using hammers to knock off some of the rust and barnacles which the motor acquired during its long submersion in sea water. The workmen are George Potts (left) and John ("Scotty") Campbell.

2. Things are looking better. The housing has been thoroughly cleaned, sandblasted and painted. Now, looking as good as new, it is being bolted together by Potts (left) and Campbell.

3. After the stator coils have been wound at the Westinghouse Emeryville plant, they are lowered into position. This is a tricky job, requiring great care to avoid damage to the windings. After the coils are firmly fastened within the stator frame, they are connected to each other with heavy copper strap busses, some of which have already been installed on the near side of the housing in the picture. John Colisas (left) is lowering a 300- pound coil, while Rodney Glazier gives signals to the crane operator above.

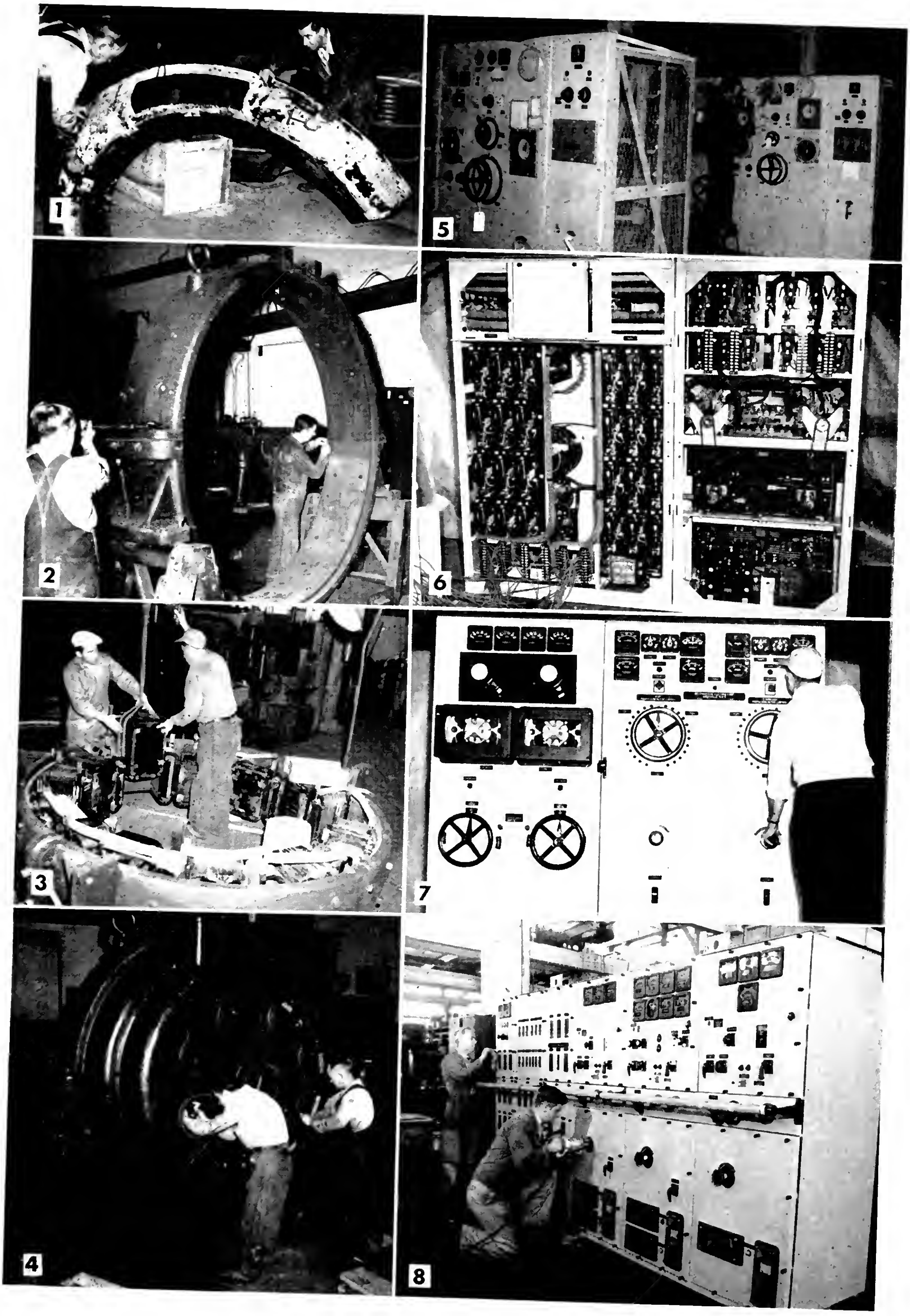
4. Bearing little resemblance to the miscellaneous barnacle-covered pieces which arrived about six weeks earlier, the dredge pump motor frame is shown here just before it left the Emeryville shop. Campbell (left) and Potts are adjusting the brush rigging. The ten-ton motor turns at 147 to 157 revolutions per minute. Its rating is now 900 horsepower—100 more than it was originally—as a result of design changes made by Westinghouse engineers.

5. The switchgear was also in bad condition when it arrived at the Emeryville shop. Two of the larger units, which had seen hard wartime service on a combat vessel, are shown before work was started on them. C. L. Painter, a Westinghouse technician, is checking the panel against the blueprints diagramming the job to be done on the board.

6. Typical of the complex re-wiring job done on the board is this picture showing the rear of the main propulsion panel in a partially-completed state. The entire re-wiring process at the Westinghouse Emeryville shop required many thousand feet of wire and hundreds of such items as shunts, relays, resistors, protective devices and contactors. Putting all these units into place in the board, and wiring them, is a job calling for highly-trained technicians.

7. Deceptively simple in outward appearance, the same board is shown from the front, after completion of work at Emeryville. This panel unit is now in the engine room of the dredge "A Mackenzie." Testing the controls which regulate the ship's main propulsion drive is Richard Scott, the Westinghouse engineer who drew up the plans for all switchgear used in the vessel.

8. A far cry from the battered condition in which it was originally received, this rebuilt panel is ready to do the important job of controlling auxiliary electric power throughout the ship. Putting final touches on the board just before it left the Emeryville, Calif., shop of Westinghouse Electric Corporation, are F. A. Anderson, Jr., and Elmer Schmidt.



On the Ways

New Construction — Reconditioning — Repairs

Five Blade Best in Test

Top: A straight-on stern view of a five-bladed propeller following installation on the "R. G. Follis."

Bottom: View of the propeller from port side.

According to information from the U. S. Coast Guard, tests conducted recently on the U.S.C.G. Cutter *Sundew,* continuing a study begun on the U.S.C.G. Cutter *Sweetgum,* indicated that a newly designed, five-bladed propeller gave practically no hull vibration at any speed. In contrast, the conventional three-bladed propeller on the *Sundew* caused hull vibration at certain operating speeds, resulting in excessive discomfort to personnel and damage to equipment.

Below: The 5-bladed propeller being readied for insallation on the "R. G. Follis," a 100,000 barrel tanker operated by the Standard Oil Company of California. The propeller has a diameter of 18 feet and weighs approximately 18 tons. It is the largest propeller ever cast at the San Francisco Yard of Bethlehem. Another picture of this propeller appeared on page 65 of the July issue.

Dredge Ladder Lengthened

In order to meet special requirements for harbor development work at Long Beach Harbor, the suction dredge *San Diego*, owned by the Pacific Dredging Company, recently had her digging ladder lengthened at the San Pedro Yard of Bethlehem Steel Company, Shipbuilding Division. Channels at Long Beach are 40 feet deep at mean low water, and in order to dredge at this depth it was necessary to extend the *San Diego's* ladder and perform certain alterations to her A-frame back stays and equalizers.

The ladder extension was of all welded construction, completely fabricated by the yard. Suction pipes were extended and Bethlehem also constructed new seatings to receive a larger suction pump.

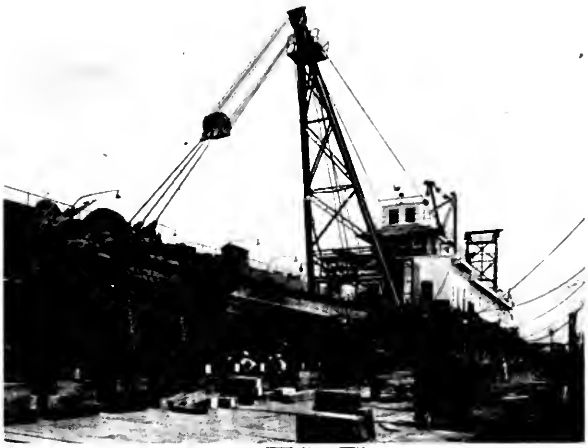
Top to bottom:

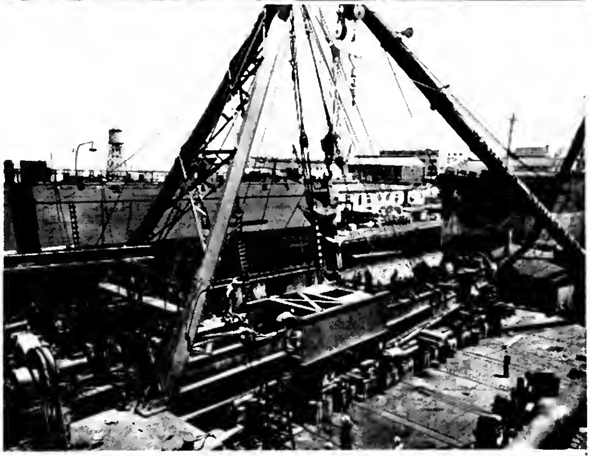
The "San Diego" immediately after being drydocked at the San Pedro Yard. This photo shows the original length of the ladder before it was extended.

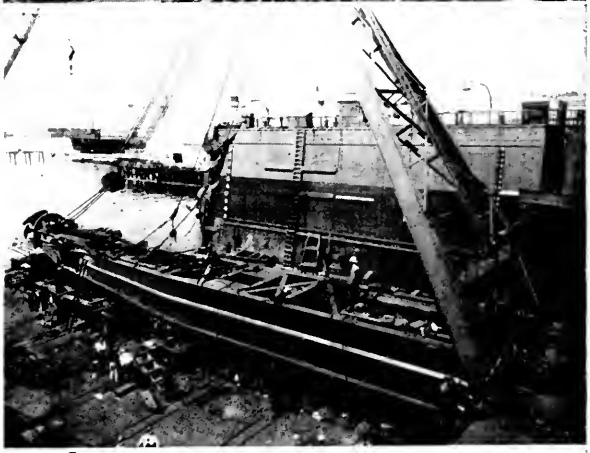
The digging ladder extension is shown being landed into place.

Ladder with extension is shown complete.

The dredge has now been undocked. The San Pedro Yard's derrick barge is being used to support the extended ladder until such time as the back stays are completed.

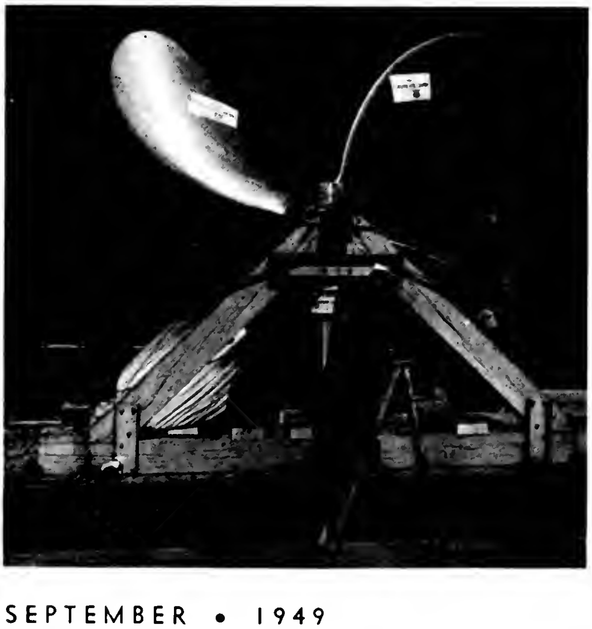


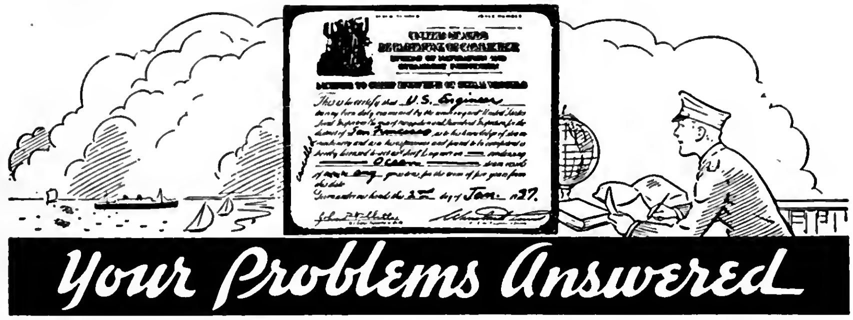




New Liberty Ship Propeller

The photo below shows a new 19,000-lb. Liberty ship propeller cast at the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division, being readied for shipment in a special rail car cradle to the British Columbia Ship Chartering Co., Ltd., in Vancouver, B. C., where it will be installed on the freighter SS "Lakemba." One of several recently turned out by the yard, the propeller is of the new Bethlehem design that enables Liberty ships to recover sea speed lost through the recent requirement lowering engine speeds in an effort to eliminate excessive tailshaft failures. A story on this new type of propeller appeared in the March issue of Pacific Marine Review.





by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

Slide Rule For Deck Officers

THERE was a long rolling wave as the S. S. *Marine Reviewer,* thirty-six hours out of San Francisco, steamed along at 18.7 knots,—110 turns on both of her twin screws. An unusually deep roll sent loose gear in

Fig. 1

the officers' day room clattering to the deck. The paper weight on Fred (Mac) McCoy's desk slid down to collide with the side panel of the filing cabinet. McCoy was First Assistant of the ship.

Young George Cambell, 3rd Asst. Engineer, was sitting at the desk pouring over a magazine article. "Look Mac," he said, "It says here 'How to make a slide rule.' Let's make one. I saw an engineer on *Marine Logger* use one to figure the fuel per mile, and a lot of other things cnce.

"Aw, go on with you, you're a minor pestilence. I can do better on the Chinese adding machine. I'll bet neither you nor Chief Farran with all your studying and his mechanical engineering degree can run one of them things, and I can. What's more, I can prove it. I'll show you, you left-handed thread."

With that Mac reached in his desk and handed out the abacus. See Fig. 1. "Now look, you numbskull. You hold it either vertical (as shown) or horizontal. Each row of six buttons represents a digit in a number. Starting at the bottom the first row is units or ones, the second row is tens, the third row is hundreds and so on."

Mac continued on . . . "As it looks now all the rows or digits are zero because the beads in the five groups are shoved to the left of the dividing column and the single beads are shoved off to the right of the column. Now suppose we want to set in a number, say 244. We slide the beads like so. (Fig. 2) 4 beads in the units row, 4 in the tens row and 2 in the hundreds row . . . Now suppose we want to add 211 to this. In the hundreds column we add 2, in the tens we add 1 and in the units we add 1. Fig. 3. It's just that simple." Mac hesitated a moment for breath.

. . . "But Mac, what if the number had six or more in it?"

"I knew you were going to ask that and I have the answer for you direct from the Chinese laundry on Stockton St. For a five, six and so on you use the one bead row. Now, look. I'll set it up for 1234567890 all at once. Fig. 4. See?

"Now for adding as before," Mac continued, "if there is one to carry we add it into the column next to the left just like long-hand adding."

"Gosh, I'll bet it takes a lot of practice to run that

thing fast like they do in the Chinese restaurants where they take your money. It looks easy though."

A knock at the door brought a bellow from Mac, "Come in, come in."

Frank Farran stepped in and closed the door. He was Chief Engineer although still a young man. He had just come up from the Bingo game in the passenger salon and had as usual won nothing. He grinned his wide smile, turned to George and said: "Cambell, are you bothering Mac again with those lessons from the correspondence school? Look out he doesn't give you some extra duties without overtime. Where did you get the abacus, Mac?"

"Oh, that's a Chinese adding machine, Chief. I got it in Yokohama some trips ago."

Farran continued: "It is not strictly an adding machine and not Chinese. The early Greeks used a form of it and called it the abax or counting table. They had cumbersome letters for numbers and found it much simpler to set up a number on a rack or sliding beads on a string than to handle the numbers in the head like we do. It has assumed many forms as it passed around the world. The Chinese and Japanese held onto it until present times because of the cumbersome numbers in their language. They not only add with it but multiply also. Skilful operators can also divide, but in multiplying and dividing a good deal is carried in the head and the machine does little more for them than the pencil and paper we use does for us. We write the numbers down on paper; they set them in a counting rack. The mental process is the same. The machine does not do the work; the brain does. Our modern adding and calculating machines really do the work. We give the machine a number and tell it to multiply by another number; it grinds away for a while and presto the exact answer comes out. Let's not call the abacus an adding machine, but a numbers rack. A blackboard on which numbers could be written easily and as easily erased would be as fast as an abacus, except in the trained hands and fingers of an expert."

Mac groaned. "A big help you are, Chief. Sure and I had George all wide-eyed at my knowledge of mathematics and you take all the glory."

"I'm sorry, Mac. But George and I both know and appreciate your knowledge more than you think. And besides, you were just having fun with him. The more we take the mystery and wonderment out of the things we see the better off we all will be. Mystery and amazement disappear with the admission of understanding and real knowledge, not magic."

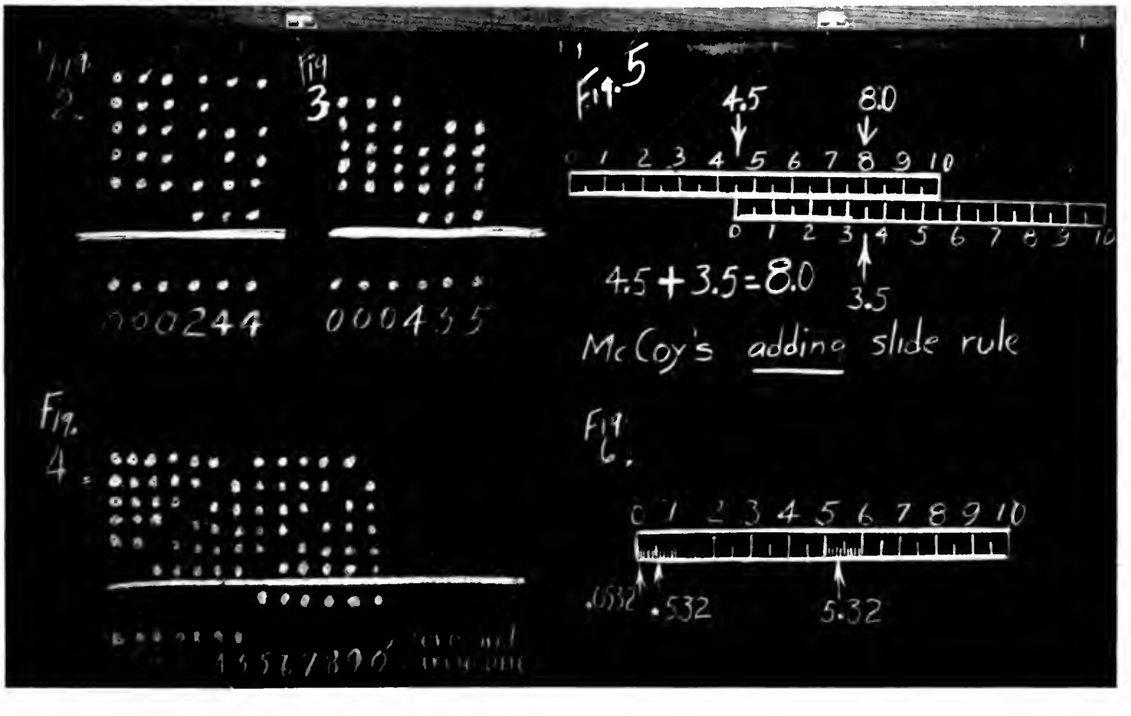
"Mr. Farran, please, how do they multiply and divide with the slide rule? Is it a rule or a machine?" George Cambell's voice was earnest.

"No, it really is not a rule. It got that name because it looks like a foot ruler except for a sliding center section. It will not measure in length units although many slide rules do have an inch and millimeter scale ruled on one edge. It is really an adding stick." Frank Farran turned to Mac. "Haven't you got a slide rule to show George, Mac?"

"Now what in the name of Heaven would I be doing with one of them things? But, I can play a tune on the floor plates of the machine shop with a hammer and a crescent wrench," Mac boasted. And what's more, I can tell the height of the water in the fresh water tanks by pounding on them with my fist. I'd like to see you do

(Please turn to page 110)

Figs. 2 to 6



Coast Commercial Craft

Above: Large tanks rest on steel cradles anchored to the floor of the hold. The barges have been built with special strengthening members to withstand operations in the Intracoastal Waterway.

Acid Tanks Go Calling

River transportation of hydrochloric acid by The Dow Chemical Company, Texas Division, has been facilitated by a fleet of five new barges specifically designed for that purpose. The fleet has just been placed in service between Dow's plant at Freeport, Texas, and the company's terminal at Cincinnati, to serve customers in the chemical processing, petroleum and metal treating industries.

Each of the new vessels, which were built by Dravo Corporation, Pittsburgh, has four rubber-lined tanks—the largest tanks of their kind ever installed in a barge. Each tank holds 58,400 gallons of hydrochloric acid, making the total capacity of one barge 233,600 gallons or 1000 tons.

Dow engineers and Dravo naval architects collaborated in design of the barges, each of which is 195 ft. long, 35 ft. wide and 11 ft. deep. The tanks are positioned in the hold so that the four domes are located in the center of the barge. A steel platform is built around the domes for a working area used during loading and unloading. The platform slopes to the outboard on either side of the centerline so any spillage will drain overboard. A coaming around the platform floor prevents acid from draining into the hold. There is a railing on the platform and the stairs to the deck for the safety of workmen. Tar and sand has been applied to the barge deck plating below the platform to prevent slipping.

The barges are designed for easy towing, having a 30-foot bow rake and a deep transom stern. They are of welded steel construction throughout and specially strengthened to withstand "rough" operations in the Intercoastal Waterway where sharp bends and narrow channels cause vessels to sideswipe the canal banks. Eight steel plate rubbing plates are welded to the sides of the barges at

(Please turn to page 112)

Below: Each of the four tanks in the barges hold 58,400 gallons of hydrochloric acid.

Pacific WORLD TRADE
Reg. U. S. Pat. Off.

Restoration of Trade With Japan

Concluding the report begun in our August issue on the Conference for the Study of Restoration of Private Trade with Japan (held on May 26 in San Francisco), financial conditions and tourist trade discussions, which were led by W. J. Gilstrap of Wells Fargo Bank, and T. L. Elliott of American President Lines, are presented here.

Existing Financial Conditions

(Discussed by W. J. Gilstrap)

The primary problem in Japan is still inflation. As yardsticks of this condition, Gilstrap pointed out that note circulation increased from 220 million yen in January 1948 to 350 million yen in December of 1948: bank deposits doubled during the same period to a level of 500 billion. Commercial loans also were doubled reaching 555 billion yen in December, 1948.

Working capital is low in most industries, and will remain so until indigenous capital can be built up through the production and sale abroad of cheaply produced goods. At present most new capital is coming from the U.S. corporations and U.S. Government aid. Much new foreign capital is needed if Japanese industry is to achieve even a subsistence level in the next few years.

As for the financial impact of the new yen rate, Mr. Gilstrap felt that it has been too short a time to judge its merits.

Japan's Income—Tourist Trade, Etc.

(Discussed by T. L. Elliott)

The tourist industry was Japan's 4th largest industry prewar. American tourists contributed about $12,000,000 a year. At present only limited stays are permitted, and accommodations are meager. Such tourists as have ventured to Japan recently have been disappointed in the available lodgings. Service is good, but food and transportation facilities are poor.

Since February of 1949, relatives of Japanese nationals have been able to visit Japan for extended periods if their relatives have lived in Japan since 1940. As a result, passenger travel in the first 4 months of 1949 has equalled the volume for all of 1948, during which time some 2,100 passengers spent approximately $1,800,000 in Japan. Elliott estimates that passenger volume for 1949 might reach 7,000, with possible dollar earnings for the Japanese of 6,000,000.

Discussion

Dhan Mukerji (Pan American Airways) opened the discussion by noting that a big problem for the airlines is that they are only carrying transient foreigners. Future growth of airline operation in Japan will only be possible when commercial Japanese are allowed to travel again. The inconvertability of yen is a big obstacle too. German occupation policy has been much more lenient; businessmen, tourists and relatives make up large volume of airline business.

Cargo volume to and from Japan for the Airlines is

W. J. Gilstrap, Vice President, Wells Fargo Bank & Union Trust Company.

now primarily with Hong Kong and Calcutta.

The Airlines are not very optimistic about the immediate future for passenger traffic and its possible tourist dollar revenues for the Japanese.

Mr. Sibbett (van Nouhuys & Co.) asked, "What role will the merchant marine play in the future of Japan's income account?"

Dr. Fine (SCAP-ESS) answered that the Japanese fleet is now very small, only 1,600,000 dwt. tons compared to more than 7 million tons prewar. Their capacity for shipbuilding is enormous at present, but the objections of American shipping interests preclude any early placement of large Japanese-built ships under Japanese flag. The issue of the future of the Japanese merchant fleet will have to be resolved by the FEC unless the U.S. makes a unilateral decision such as they did in the matter of reparations.

Shipping income must be increased, even if only to the level attainable in carrying essential trade. The basic problem is to take the drain off of the dollar exchange in Japan (furnished by American taxpayers) now going for freight.

The Japanese are now building tankers for Danish and Norwegian accounts up to 10,000 dwt. tons. More orders await a policy decision by the FEC, or at least an interim policy decision by the State Department.

The ships now being built are being paid for partly in dollars, partly through raw materials barter deals.

Mr. Desmond (Engineering Consultant to Mitsubishi & Co., Tokyo) added that Swedish interests are negotiating with Mitsubishi Shipbuilding to build a 20,000 ton tanker. Danish interests are also interested in 3 vessels of 10,000 tons, 16,000 tons and 20,000 tons.

He also noted that contracts were recently signed by Mitsubishi for the re-engining of 2 vessels (using Krupp-licensed, Mitsubishi-built engines) at $175,000 each, less than would be possible in Germany.

Mr. Desmond went on to comment on his experiences in Japan regarding some bad trading practices by certain Americans in the postwar period. (He estimated that 3/4 of the first draft of American businessmen who re-entered Japan for trade in 1947 are now out of business.)

He concurred with previous speakers as to the folly of toy distributors buying silks, ceramics buyers buying tops, etc., and related one experience he had in this regard. A New York firm inquired about cameras of a large Japanese exporter. Samples were sent free of charge, with no orders forthcoming. After a while the same American firm inquired about candles, with equal enthusiasm about the potential market in the U.S. as they had expressed for cameras. Samples were sent, but no orders came through. The interest switched to silk scarves, and finally settled down to bicycles. A large order was indicated. At the exporter's expense several bikes were air-freighted to New York, and Desmond himself made the trip to help launch an exhibit which was to be held for the benefit of a group of interested buyers. On arrival Desmond found the address of the American firm was a phoney, and as far as he knows their office was nothing more than a hotel room or telephone booth. The deal never came off, despite a CIF price of $18.80 landed in New York.

The Japanese exporter's indignation is readily understandable, continued Desmond, when one realizes the intricate maze of red tape that must be surmounted in garnering enough supply in Japan of any item in order to be able to quote a quantity price.

The bicycles were finally sold to India, as is the case with so many products in Japan today.

Mr. Dickson remarked that he heartily agreed that certain Americans had caused ill will, but he added that some reliable American firms had gotten into bad deals with "hole in the wall" exporters in Japan who couldn't produce the merchandise they were offering and quoting.

Dickson went on to pose a question to Mr. Fine regarding floor prices set by SCAP on certain commodities. On what basis are floor prices made? Are they set at the level of the lowest cost producer? Are they really necessary? Several producers have told Dickson that they could sell below floor price and still make a fair profit, but that they were prohibited from doing so.

Dr. Fine admitted that floor prices are not as necessary now as they were a year ago when Japanese manufacturer was just getting back into the export game and was in danger, due to his ignorance of market conditions abroad, of quoting too low a price. SCAP's only interest is in seeing that producers don't take losses. As time goes on, he continued, the justification for floor prices will disappear.

Desmond added that the influence of certain American industries, particularly dry goods distributors and manufacturers, must not be overlooked in regard to prices on Japanese textiles. If they were allowed to be dropped, you'd hear a howl go up from the dry goods people in this country.

The comment was made that certain raw materials shipments to Japan were of inferior quality, and that some of the American bidders on SCAP shipments were not even in the phone book.

Desmond answered that a bond of $25,000 is required on all bids now, and that regardless of the credit rating of the bidder, he has equal chance with all others, at least on open bid commodities. Several American firms who weren't in the phone book before they started bidding, are now in the "big business" bracket and they did it by honest fulfillment of their contracts. On the other hand, reliable firms have sometimes failed to meet their delivery or quality obligations.

Dr. Buss asked about the possible moves to improve hotel facilities for commercial and tourist travellers.

Dr. Fine answered that his opinion was that the

Pacific World Trade

Japanese themselves would probably want to develop any new hotel facilities.

Mukerji re-emphasized the disappointment of travellers at the poor lodgings available, and mentioned the work of Pan Air's hotel subsidiary in South America and Siam, in helping to design and finance new facilities there. The same groups could do a similar job in Japan without disturbing the natural desire of the Japanese for their own hotel development.

Desmond mentioned that a group from New York City had made an independent survey of hotel potentialities and had succeeded in interesting a large Eastern hotel chain in the idea of building new hotels.

Gilstrap asked Dr. Fine just how SCAP went about setting the new exchange rate at 360 to the dollar.

Dr. Fine explained that it was set by pressure on the one hand for the lowest possible rate which would not do immediate damage to the price level in Japan, and on the other hand by pressure from external factors governing the price of Japanese products in the world markets.

The 360 to 1 rate was chosen only after an exhaustive survey of bankers in Japan and this country, and after due consideration by the National Advisory Council in Washington. The choice was unanimous when all considerations were taken into account.

Gilstrap then asked, "What are the possibilities of Japanese bankers being allowed to handle export shipments in the future?" (At present they are only allowed to do domestic banking.)

Dr. Fine answered that it is not contemplated for the immediate future but is a good possibility later on.

Mr. Brooks Darlington (Far East-American Council for Commerce and Industry) suggested that one of the greatest needs in developing markets here and abroad for Japanese products is in the field of public relations. They must propagandize their products, their skills and their tourist attractions in the American market if they expect to earn dollars here. What is SCAP doing to sell Japan to the world?

Dr. Fine answered that he realized this need, especially in selling the idea that Japan is not a totally devastated country, but that so far SCAP has not been in a position to do a selling job. He felt that most of the "selling" would have to rest with the airlines, shiplines, and traders for the present.

S. F. State College Opens School of World Business

A School of World Business, first of its kind in the Western United States, opened in September at San Francisco State College.

The School was created after more than a year of study by a special committee of the World Trade Committee and World Trade Association and officials of San Francisco State College.

Operating under the direction of State College, the new School will initiate classes on the local campus, with later expansion planned at a downtown site. In addition to the facilities and instructors available from the College, the School will draw on local foreign traders and shipping men for specialized and practical courses.

L. M. Giannini, president of the Bank of America, has been appointed chairman of the Board of Associates of the School, and Charles L. Wheeler, executive vice-president of Pope and Talbot, Inc., is vice-chairman.

Although the School is set up as a full four-year course, upperclass students will be admitted to the third and fourth year "professional" courses upon presentation of proper academic requirement. Areas of specialization for students will include marketing abroad, finance and transportation. Concentration on geographical areas will also be featured, with instruction being given in both groups and seminars.

Catalogs for the School are available from San Francisco State College.

Seattle's Manager of Foreign Trade Zone

Chosen for the important post of heading the Seattle-Pacific Northwest foreign trade facility is Robert O. Edwards, well-known in traffic and shipping circles. His duties will be to manage and conduct the operation of the Zone, to promote traffic through it, to contact, and to explain Zone procedures and uses, to prospective users of the Zone.

Edwards goes to the Port of Seattle from the post of traffic manager for the Naval Supply Depot, Pier 91, Seattle. He has been in Naval traffic work since 1941. He was traffic manager until his discharge from the service in January 1946, and then in the same position as a civilian.

A graduate of the University of Washington, Edwards was a crew manager of the 1936 Olympic champions. He went to work for the Port of Seattle following his graduation, starting at the old Atlantic Street Dock. He was assistant traffic manager when he left the Port in 1941 to enter Naval Service, by which time he had worked at all the Port of Seattle waterfront terminals in traffic or operating capacities.

In 1937, during his time with the Port of Seattle, Edwards assisted in the special survey of the feasibility of establishing a foreign-trade zone on Puget Sound.

Site of the Port of Seattle's new Foreign Trade Zone is the East Waterway in Seattle.

Robert Edwards

Trade Directory of Indonesia

Now obtainable at the Western Division of the Netherlands Information Bureau at San Francisco is the latest trade directory of Indonesia (1949).

The Directory, published by the Foreign Trade Information Service of the Bureau of Commerce, Department of Economic Affairs at Batavia, is a bulky volume whose 964 pages contain all available information of commercial interest regarding Indonesia. It is priced at $10 per copy. Please enclose check or money order with your order.

Contents include:

Geographical map of Indonesia.

SECTION I:

Trade Commissioners for Indonesia, Foreign Trade Information, Import and Export regulations, Foreign Trade Statistics, Consulates in Indonesia, Scientific Institutes, Nivig (Netherlands Indies Organization of Importers, Wholesale-dealers, Oveip (Organization United Exporters of Indonesian Products.

SECTION II:

Shipping, Airways, Principal Banks, Principal Hotels, Insurance.

SECTION III:

Alphabetical list of export products; alphabetical list of exporting firms (312) with particulars; alphabetical list of export products with firms concerned.

SECTION IV:

Alphabetical list of import articles; Alphabetical list of importing firms (1150) with particulars; Alphabetical list of import articles with firms concerned.

SUPPLEMENTARY STATEMENT:

I Shipping, II Airways, III Banking, IV Insurance, V Export and Import. Errata. Changes of Address. Index to Advertisers.

"Do-Don'ts" For Letters of Credit

A list of "do's and dont's" for United States foreign traders to avoid making amendments to letters of credit has been compiled by Allis-Chalmers Manufacturing Co. and is now being distributed to members of the Foreign Credit Interchange Bureau of the National Association of Credit Men.

Some of the following items, although of interest to all in the trade, apply specifically to Allis-Chalmers shipments.

DO'S

In the Allis-Chalmers list of do's are the following:

1. Establish your letter of credit to be irrevocable and confirmed by a bank in the United States.
2. Establish your letter of credit to be payable upon presentation of documents.
3. Establish your letter of credit for a sufficient amount of money to cover the full dollar value of the equipment plus any additional charges which may be involved such as inland or ocean freight, insurance, etc. If the price of your merchandise is subject to increase, provide sufficient funds to cover the possible increase and state in the letter of credit that a "price increase may be paid hereunder."

If your letter of credit provides for separate amounts for merchandise and for shipping expenses, be sure that enough is provided for each, since banks will not permit merchandise funds to be used for expenses, or vice-versa.

4. Describe merchandise in broad and simple terms.
5. Describe merchandise in English.
6. Simplify insurance requirements in the letter of credit. The letter should simply state "Insurance Certificate Required" when the other party is to insure.
7. Provide in the letter of credit for shipment by air or parcel post if your order admits the possibility of such shipment.
8. Include in the letter the statement "This letter of credit permits part or full payment" when applicable.
9. Include the statement "Consolidated shipments under this and other letters of credit permissible" to avoid excessive shipping costs when small shipments are ready under different letters of credit.

DONT'S

On the don't side, the company advises:

1. Do not show weights or dimensions of merchandise in your letter of credit.
2. Do not show point of origin or port of exit of the shipment.
3. Do not use the term "CIF" or "C & F" in the letter.
4. Do not show import license numbers in the letter.
5. Do not refer to pro forma invoices in your letter of credit to avoid the need of an amendment to cover any change you may subsequently wish to make in the order.
6. Do not show model numbers, model names, specifications or other details of catalogue description in the letter.
7. Do not use restrictive words in describing merchandise.
8. Avoid stating in the letter of credit the use for which the merchandise is intended.
9. Avoid specifying in the letter of credit the use of named steamship lines or ocean carriers.
10. Do not require that invoices include special statements, particularly regarding the type, quality, or quantity of merchandise, or its conformation to a particular order.
11. Do not include prices in your letter of credit unless there is absolutely no chance of a future change.
12. Do not require a railroad bill of lading.
13. Do not itemize accessory equipment in your letter of credit.
14. Do not prohibit partial shipments.
15. Do not specify the individual insurance risks to be covered when insurance is to be effected under your own open policy.

Admiralty Decisions

By HAROLD S. DOBBS of San Francisco Bar

Supreme Court Reverses Hust vs. Moore-McCormack Decision

IN the decision of the Supreme Court of the United States in Hust v. Moore-McCormack Lines, Inc. the Court held that for the purposes of liability under the Jones Act, a general agent operating in that capacity for the United States of America was subject to suit by a seaman employed aboard a vessel owned and operated by the United States of America. In other words, the decision completely discounted the lack of showing of a true employer-employee relationship. The court permitted itself to rely upon a fiction that for the purpose of suit under the Jones Act, the general agent was made responsible as an employer even though the facts failed to justify any such conclusion. Fortunately, the diligence of admiralty lawyers in the United States has caused the Supreme Court to reconsider its position as a result of a number of cases which were pending before it on writs of certiorari, and now the decision announced in the Hust case has been specifically overruled in Cosmopolitan Shipping Company, Inc. v. Robert A. McAllister and other cases such as Fink v. Shepard Steamship Company, Gaynor v. Agwilines, Inc., and Weade, et al v. Dichmann, Wright & Pugh, Inc.

In the Hust case, we saw a situation where a seaman was injured aboard ship in which a general agent was involved, and then later in Caldarola v. Eckert, which was relied upon in the Cosmopolitan Shipping Company case and related cases, wherein a stevedore was injured aboard a ship and the Supreme Court held that the agent was not responsible.

Another element that was introduced into the confusion and controversy within the past few years, was the enactment of a War Shipping Administration act known as the "Clarification Act." According to the admiralty counsel who argued the Cosmopolitan Shipping Company case, and cases related to it, the Clarification Act was passed to eliminate the problem that had been caused to come into existence as a result of the Hust case. The courts, however, up until this time, had failed to place any real emphasis on the Clarification Act except, as I said, to confuse the issue.

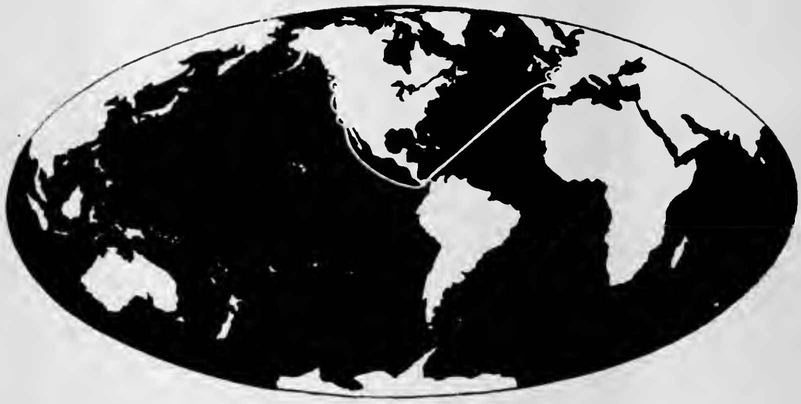
In the Cosmopolitan Shipping Company case, which is similar to the others I have already mentioned, the seaman was procured from the union hiring hall by the general agent in accordance with the terms of the standard working agreement with the United States (War-time standard form of agency agreement GAA 4-4-42), and made available to the master for employment by him. The master is designated by the contract as an agent and employee of the United States. In July of 1945, McAllister, the seaman in this case, was signed on the S.S. *Edward B. Haines* at New York by the master of the vessel as Second Engineer. In the space on the shipping articles entitled "Operating Company on this Voyage," there was written "Cosmopolitan Shipping Co., Inc., as general agent for the United States." The articles were stamped at the top as follows: "You Are Being Employed By the United States."

In November, 1945, when *Haines* was on voyage and either in port or off the coast of China, McAllister contracted poliomyelitis. At that time the master exercised "full control, responsibility and authority with respect to the navigation and management of the vessel" as provided in Sec. 3A(d) of the contract. Because of alleged negligence of the master and officers in furnishing proper treatment he suffered permanent injury from the disease. McAllister sued the general agent under the Jones Act. The complaint alleged that Cosmopolitan "managed, operated and controlled" *Haines* under a General Agency Agreement with its owner, that McAllister was in the employ of Cosmopolitan, and that his injuries resulted from the negligence of Cosmopolitan, "its agents, servants, and employees" in failing to take precautions against a known poliomyelitis epidemic and in failing to provide proper treatment. The answer denied these allegations.

The jury found a verdict for the seaman, McAllister, in the sum of $100,000.

On appeal the United States Court of Appeals for the Second Circuit affirmed. While recognizing that Cosmopolitan was "a shipping company which contracted with the War Shipping Administration to attend to the accounting and certain other shoreside business of *Haines* . . . in accordance with the standard form of General Agency Service Agreement, the Court felt itself bound by the decision in Hust v. Moore-McCormack Lines. The Court of Appeals reached this conclusion despite the fact that the injury to Hust occurred prior to the Clarification Act, and the injury here occurred subsequent to that act. In its view the Hust case held, as a matter of law, that before the Clarification Act a seaman under the Jones Act could recover for a tort against a service agreement

(Please turn to page 88)



FRANCE
BELGIUM
HOLLAND

Operating a fleet of newly-constructed 17-knot motorships, the WYOMING, WASHINGTON, and WINNEPEG, The French Line is providing a fast, regular monthly service from Pacific Coast ports to and from the North Atlantic European ports of Antwerp, Rotterdam, Havre, Dunkirk and Bordeaux.

French Line CIE GLE TRANSATLANTIQUE

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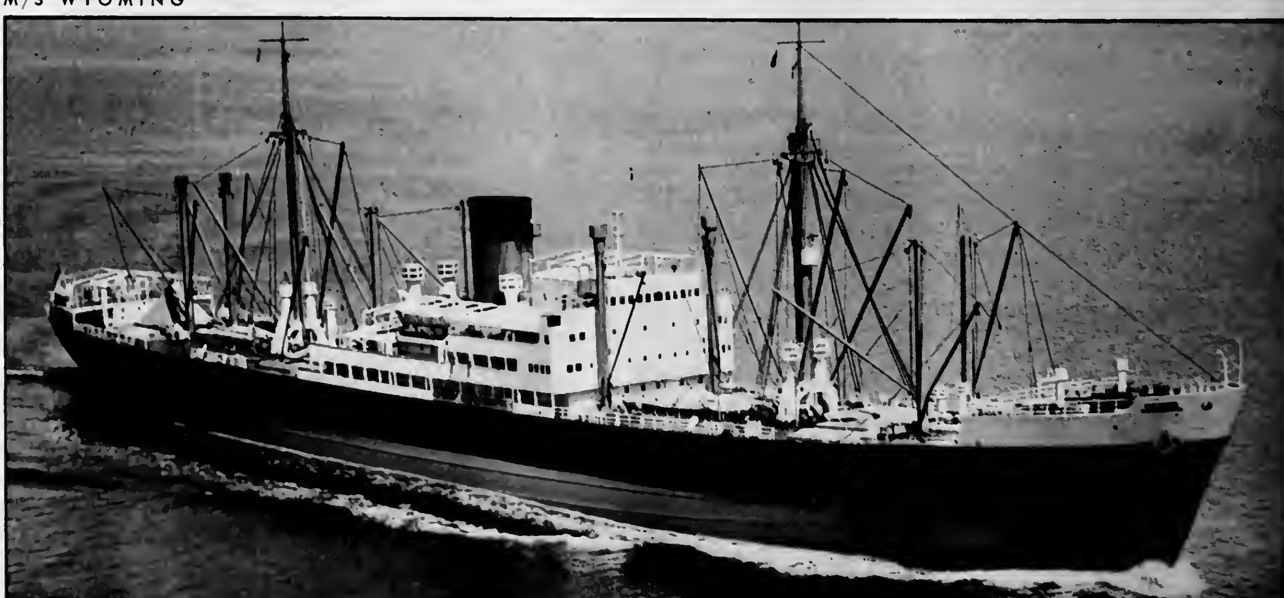
All vessels are of 10,000 deadweight tons and have extensive capacity for refrigerated cargo and comfortable accomodations for twelve passengers.

M/S WYOMING



The General Steamship Corporation

As General Steamship Corporation, Ltd. moved into its new and permanent "own" home at 432 California Street on August 15th, a backward glance brought memories of two other moves in San Francisco . . . from 280 Battery Street where the company started in business in 1920 to number 240 in the same street; then to the Merchants Exchange Building in California street where continued growth necessitated expansion to both sides of the lobby on the street floor, and scattered offices elsewhere in the building. So it is with a feeling of gratitude and satisfaction that the activities of the traffic, chartering, communications, passenger and all other departments in the home office are again consolidated.

NEARLY thirty years ago General Steamship Corporation entered the field of Pacific Coast shipping, and almost immediately became an important factor in the subsequent history and development of this vast trade. Although new in name, the roots already reached deep into the traditions of the industry, for it represented an

HARRY S. SCOTT, President, General Steamship Corporation

Few men in the last quarter of a century have played a more important part in the upbuilding of Pacific Coast foreign trade than has Scott, who was active in the creation of General Steamship Corporation and assumed its presidency in 1921. With foresight and courage, plus natural ability to organize men, he has been instrumental in the establishment of one new steamship line after another. By reason of his constructive work in shipping, he had conferred upon him by the Italian Government the title of Cavaliere by the Order of the Crown of Italy in 1932. In 1944 he received the Knight's Cross, First Class, Order of Vasa, from the Government of Sweden. In July, 1947 he received from the Norwegian Government the Knight's Cross, First Class, of the Order of St. Olav, and in September of the same year, the French Government conferred the Cross of the Legion of Honor with the Grade of Chevalier.

R. V. WINQUIST
Vice-President in charge of traffic, General Steamship Corporation.
After service in the first World War with the Navy Department, Washington, and later with Bernard M. Baruch, Chairman of the War Industries Board, Winquist entered the shipping business in 1919. His various assignments included experience in Washington, New York, Europe and South America. While in Rio de Janeiro he met Harry S. Scott and this led to Winquist's appointment in 1926 as manager of the General Steamship Corporation's Trade Promotion department. He later served in the capacities of Assistant to President, and General Traffic Manager, prior to his appointment as Vice-President in charge of traffic in 1941. In this capacity he has supervision over all of the Company's liner operations.

outgrowth of various shipping interests. Harry S. Scott and Drew Chidester, who took over the presidency and vice-presidency of the company shortly after its formation in 1920, had previously been affiliated with the Trans-Oceanic Company and the Barneson-Hibbard Company.

These two men were convinced from experience and by observation that there was room for a vast expansion of Pacific Coast trade. They believed that fast and efficient vessels, irrespective of flag, were needed for the development of this commerce. It was this vision that led to the adoption of policies which soon brought the company's operations to international scope.

During the next two decades numerous trades were developed, so that by the outbreak of World War II, General Steamship Corporation had become agent for nine steamship lines, flying the flags of seven nations. There were close to 100 vessels, aggregating 823,000 deadweight tons, accepting cargo for "700 Ports on All the 7 Seas" . . . a slogan the company spread around the world.

The agency for the United Ocean Transport Company was the first to be brought into the newly-formed corporation by Scott and his associates. This Line had begun transpacific operations in 1917 and continued to maintain numerous regular sailings in that trade.

The French Line

The Pacific Coast business of the world-renowned Compagnie Generale Transatlantique, known more generally as the "French Line", was the next addition, beginning in 1921. By the following year, this Line maintained a total of 15 sailings between the Pacific Coast and Continental Europe via the Panama Canal. By 1940 when the Second World War disrupted the trade, the service had been built to a fortnightly basis, and was maintained with new, fast ships, equipped with modern refrigeration facilities, and with accommodations for 35 to 40 passengers.

With the aid of the French Line, considerable pioneering was done, and many new Pacific Coast products found their way to Europe. The Line called regularly in ports of Central America, the Canal Zone, France, Belgium and Holland.

Despite the loss of its finest ships in the war, the French Line has now resumed its principal world-wide operations including its line to the Pacific Coast. It is today not only celebrating the re-establishment of its large transatlantic passenger business with the *De Grasse, Ile De France* and *Liberte,* but is also introducing new ships in its Pacific Coast trade. These are appropriately named *Wyoming, Washington* and *Winnepeg* and will be followed by a fourth vessel, as yet unnamed. They are of 17 knot speed, equipped with large refrigerator compartments and accommodations for passengers.

Pacific Australia Direct Line

During the latter part of 1921, when the American Government discontinued some of its trade routes, and uncertainty hung a heavy cloud over world shipping, Scott and other executives of the General Steamship Corporation, looked into the field to ascertain what might be done to maintain uninterrupted service from the Pacific Coast to Australia. They approached Gunnar Carlsson, managing director of the Transatlantic Steamship Company of Gothenburg, Sweden, with the result

ALLAN KERR HULME
Vice-President in charge of Chartering and Operations, General Steamship Corporation, San Francisco.
After a taste of the shipping business with East Asiatic Company at the age of 14, Hulme went to sea under sail and steam for 8 years and obtained his Chief Officer's license in 1921. In 1923 he came ashore and joined General Steamship Corporation on the inauguration of its Chartering Department; became manager of the department in 1924; named Vice-president in charge of chartering, sales and purchase in 1939. The Company's Operating Department was also placed under his direction in 1941. During the war this department managed vessels assigned to the Company as general agent and sub-agent by the War Shipping Administration and by The British Ministry of War Transport. Hulme was also consulted by the U. S. Maritime Commission and placed in charge of their Off-hire Division on the Pacific Coast. In September 1948, he was awarded the King's Medal by the King of England for Service in the Cause of Freedom.

Assisting Hulme in the San Francisco office are Peter Curtis and C. P. Mathe of the California branch of the Chartering Department; Captain K. A. Hulme and Claud Morris in the Tramp Ship Agency and Husbanding Department; Craig Wallace and Stanley A. Lund in Seattle.

Los Angeles

Entrance to the Los Angeles office of General Steamship Corporation, located in the new General Petroleum Building. This is said to be the most modern office building in the United States.

CAPT. H. H. BIRKHOLM

Vice-President, Southern District, General Steamship Corporation, Los Angeles. Coming from a family of pioneer shipowners and seafarers, Capt. Birkholm began his seagoing career at the turn of the century, and followed it for 18 years. Then he joined with H. S. Scott to head up operations of the Transoceanic Steamship Company in Seattle, which led to his association in 1920 with the General Steamship Corporation. He was manager of the Seattle office covering activities in the Puget Sound, British Columbia, Grays Harbor and Columbia River areas; operating manager in the San Francisco office; and then placed in charge of the Southern California district. In 1931 he became a Vice-President of the Corporation. In addition to his other duties, during the war he was elected president of the Los Angeles Tanker Operators, Inc. (now the American Pacific Steamship Company) which operated 800,000 deadweight tons of U. S. Government tankers and a large fleet of dry cargo ships.

that a contract was consummated that has linked these two firms together ever since. The service then inaugurated and given the name of Pacific Australia Direct Line has operated without interruption for 28 years . . . even through the trying times of World War II. When the war diverted a large part of the tonnage from Australian trade, Transatlantic's "neutral" vessels continued operations throughout the period, entirely in cooperation with the American, British and Australian governments. The service thus rendered was praised by officials of the various governments concerned and the Pacific Australia Direct Line was characterized as "the life line to Australia".

The early steamers which inaugurated Transatlantic have been replaced since the war by modern motor ships. Some of these operate at 15 to 16 knots, and others as fast as 19 to 20 knots. In the latter class, the Line introduced the M.S. *Nimbus* and M.S. *Stratus* to Pacific Coast shippers during the past year.

Westfal-Larsen Company Line

In 1925, after a careful survey was made following a visit by Scott to Argentina and Brazil, a service was

Los Angeles Office Views.
Above: Passenger Department.
Below: Freight Department.

established between the Pacific Coast and the East Coast of South America by Messrs. Westfal-Larsen & Company, well-known shipowners of Bergen, Norway. The Line became known as the "Westfal-Larsen Company Line"—a name that has become well established in the import and export trade of the Western Hemisphere. It has maintained an uninterrupted schedule ever since its inauguration except for the period when its vessels were diverted into more vital war service through the cooperation of Norwegian interests with the American War Shipping Administration. The war took a heavy toll of tonnage from the Company's fleet of ships, but after its termination, the Line was quickly re-established with newly acquired motor ships.

W. B. BRYANT
Local Manager, Los Angeles Office.

When Bryant joined the staff of General Steamship Corporation as tally clerk at Pier 41 in 1933, he had just graduated from Stanford University. The following year he was transferred from San Francisco to the Los Angeles office where he successively handled documentation, inbound traffic, European, South American and Oriental services, outward solicitation and traffic. He was named Assistant District Manager in May, 1941, and appointed District Manager, July, 1943.

These vessels actually circumnavigate the South American continent. They proceed from the Pacific Coast via Peru and Chile, through the Straits of Magellan to the Argentine, and return via Brazil and the Panama Canal. A large assortment of American and Canadian cargoes are carried to these important markets, and the ships return with the products of Argentina and Brazil.

Since its inception, nearly a quarter of a century ago, the Line has been an important factor in the upbuilding of trade between the Pacific Coast and Latin America.

Italian Line

Also in 1925, Scott and his associates interested certain Trieste shipowners in the establishment of the first direct line from the Pacific Coast to the Mediterranean. This service was originally operated under the corporate name of Navigazione Libera Triestina, S. A. and was known as the "Libera Line". Ten years later, in 1935, it merged into the larger organization of the Italian Line, officially known as "Italia"—Societa Anonima di Navigazione. An entirely new trade resulted from these efforts, and Pacific Coast products were exchanged for Mediterranean goods in growing quantities.

By the time the war broke out, the Italian Line was recognized as one of the foremost in the passenger and

FRANK A. REEVES
Secretary-Treasurer, General Steamship Corporation, San Francisco.
Reeves obtained his first shipping experience as a clerk at the Great Northern docks in Seattle in the handling of silk cargo transhipments. In 1918 he began his association with H. S. Scott when he joined the Transoceanic Company as cashier. With the formation of General Steamship Corporation in 1920, he became accountant and cashier. Since 1922 he has been Secretary-Treasurer of the Corporation, and a Director since 1934.

freight business between Europe and the Pacific Coast. Within the past year, the Line has been able to reinstate its sailings, and is now well on the way toward rebuilding its fleet with passenger and freight vessels that will exceed in speed and facilities those which were operated in the trade before the war.

Kerr-Silver Lines

In 1927, the Kerr-Silver Lines were added to the company's growing list of clients. This operation eventually developed into three distinct services by providing Pacific Coast exporters with new markets in the Netherlands East Indies, Straits Settlements, India, Persian Gulf, and South America. These countries had previously been reached either by transhipment or very limited service. In 1940, the Kerr Steamship Company opened its own

D. M. DYSART, Vice-President
Northern District, General Steamship Corporation, Seattle, Washington

Prior to his connection with General Steamship Corporation in 1932, Dysart gained experience in traffic with the Matson Navigation Company, Walworth California Co. and Dimon Steamship Corporation. He was called into active service in the U. S Navy in charge of ship loading, in San Francisco and Redwood City. Following the War, in December, 1945, he rejoined the Company and became Vice-President in charge of the Northwest district in May 1946.

offices in San Francisco, but General Steamship Corporation carried on as agent in Los Angeles, Portland and Seattle.

. . . . . .

The Shepard Line was added to the General Steamship roster in 1930 when intercoastal sailings were started from the Pacific Coast to Philadelphia, New York, Boston and Albany. This operation, which was interrupted by the war, has not been resumed.

Pacific Islands Transport Line

The ninth service developed by General Steamship Corporation in the pre-World War II period, was the Pacific Islands Transport Line, operated with vessels owned by A/S Thor Dahl of Sandefjord, Norway. As a result, definite strides were made in the development of the trade between the South Sea Islands and the Pacific Coast . . . an operation which was carried on throughout the war in cooperation with the Allied shipping authorities. The territory served embraces such romantic islands as Tahiti, the Fijis and New Caledonia.

C. A. REALI
Assistant Vice-President in charge of Traffic, General Steamship Corporation, San Francisco. Reali began as office boy with the Parr-McCormick Steamship Company in 1917. Three years later he joined General Steamship Corporation as Assistant to the Purchasing Agent, and was successively in the Operating and Traffic departments. He was appointed Assistant Traffic Manager in 1928, Manager of Australian and South American departments in 1932, General Traffic Manager for the Company in 1940; and elevated to Assistant Vice-President in April 1948.

War Operations

Shortly after the outbreak of World War II, General Steamship Corporation, as an intergral part of the American maritime industry, placed the experience and resources of its entire personnel into the cause, converting itself largely from a traffic agency to a complete operating organization.

It was appointed as a General Agent for the War Shipping Administration, and in this capacity handled 25 Liberty and Victory type vessels. In addition, it acted as agent on the Pacific Coast for a number of W. S. A. General Agents whose headquarters were located in Atlantic or Gulf ports. These included the Mississippi Shipping Company, West Indies Steamship Company, American-Foreign Steamship Company, Isbrandtsen Company, A. L. Burbank and Company, North Atlantic and Gulf Steamship Company, Blidberg Rothschild and Company, T. J. Stevenson and Company, and the Cosmopolitan Shipping Company.

General Steamship Corporation also served as agent for numerous vessels consigned to it by the British Ministry of War Transport, the Norwegian Shipping and Trade Mission, and various Canadian interests. During the height of war activities, the Company had under its agency a total of 175 vessels which it manned, stored and repaired.

During this time, General Steamship Corporation was instrumental in the organization of Los Angeles Tanker Operators, Inc., for which it supplied the management and partial financing. During the peak of its activities, this tanker company operated for account of the United

JOHN R. PAGE
Assistant Vice-President in charge of European Services, General Steamship Corporation, San Francisco. Prior to joining the General Steamship Corporation as Assistant Traffic Manager in 1934, Page was with the American Pioneer Line in a seagoing capacity. He was in the Navy in World War II, reaching the rank of Commander, and in 1945 served with the U. S. Delegation to the United Maritime Authority in London. In April, 1948, he was appointed Assistant Vice-President, in charge of the company's European Department.

MORSE FRAZIER, Assistant Vice-President, in charge of Australian Department, San Francisco.

Upon completion of his schooling, Frazier started to work for General Steamship Corporation as Dock Clerk. He moved ahead rapidly and in 1939 was made manager of the Australian Department. When the Pacific Orient Express Line was established in 1946, he took over its management in addition to his other duties, and this year was made Assistant Vice-President of General Steamship Corporation.

San Francisco

Top: Just inside the main entrance showing passenger department. The great map on the wall is the work of Artist John Garth.

Center: An extended view of main floor just beyond the section shown above.

Bottom: Traffic Department.

Top: Communications Center.

Center: Chartering Department.

Bottom: Roof Garden of Ladies' Club Room.

Portland

Top and Center: Two interior views of Portland Office.

Bottom: Exterior of Portland Office, located in the heart of the city.

Seattle

Top: Interior view of general office, Seattle.

Center: View of Passenger Department.

Bottom: Entrance to Seattle office.

L. I. McKIM, Traffic Manager, San Francisco.

His transportation career began in 1916 in the Passenger Department, with the Southern Pacific Company. Subsequent positions identified him with the Pacific Mail Steamship Company, the Sacramento Northern which merged with the Western Pacific, and the River Lines, where he became Assistant Traffic Manager. He became associated with General Steamship Corporation in charge of solicitation in August, 1937, and was appointed Traffic Manager in 1945.

States government, a total of 51 T-2 type tankers. General Steamship Corporation also acted as agents for these ships in the ports of San Francisco, Portland and Seattle.

The name was subsequently changed from Los Angeles Tanker Operators, Inc. to American Pacific Steamship Company, after which it also undertook the operation on a bareboat charter basis of 14 government-owned Liberty vessels. These were engaged in worldwide trading.

Pacific Mediterranean Line

Following the war, the General Steamship Corporation met the pressing demands of exporters with the inauguration of the Pacific Mediterranean Line, between Pacific Coast ports of Canada and the United States, and various Mediterranean ports, with special emphasis on North Africa, Greece and the Near East.

Independence Line

The company was also instrumental in the postwar establishment of the Independence Line which furnished a regular service between Pacific Coast ports and Central America, Panama, Colombia, Ecuador and Venezuela. General Steamship Corporation acts as managing agent.

Pacific Orient Express Line

Following a survey immediately after the war, arrangements were concluded for the establishment of the Pacific Orient Express Line for operation primarily between the Pacific Coast and North China and Japan. This Line, which began in 1946, is maintained with fast, new motorships owned by the Ditlev-Simonsen Lines of Oslo, Norway, and the Transatlantic Steamship Company of Gothenburg, Sweden. The intinerary of the service now includes the Philippines, Hongkong, Shanghai and Japan. Resumption of calls at North China ports within an increased frequency of sailings will be provided as soon as the political situation in China is sufficiently settled to permit normal trading.

Traffic Department

One of the most important units of the organization is the Traffic Department which is charged with the handling of liner business. It is composed of three main divisions: Transpacific (subdivided into Australian and Far East sections); European (Continents and Mediterranean sections); and Latin American (West and East Coast of South America and Central America sections. This division also handles traffic to and from the South Seas). It is staffed by men with many years experience in their respective fields who have a thorough knowledge of traffic and transportation matters and are fully informed with regard to trade conditions in the areas served by the Lines which they handle.

Other component parts of the Traffic Department are the Documentation Section, which handles all manifests, Bills of Lading, etc.; the Inbound Section, which supervises distribution of inbound cargo including forwarding by rail, truck, and water; and the Solicitation and Trade Development staffs which are prepared at all times to assist importers and exporters in extending their activities and obtaining new connections in various parts of the world.

Liner business in the Branch offices is similarly divided between traffic experts, each specializing in a particular field.

Since its very formation, General Steamship Corporation has never deviated from its strict policy that it will not enter into competition with its customers. It is one of the principles upon which the company was founded, and one from which it will never vary. General Steamship Corporation operates ships exclusively, and no matter how tempting the opportunities, it has carefully avoided the extension of its activities into any manner of merchandising. Importers and exporters alike can deal

R. K. BROWN, JR., Local Manager,
Seattle Office of General Steamship Corporation.

After long experience in transportation with the Pacific Northwest Demurrage Bureau in Seattle, and the Copper River & Northwestern Railway at Cordova, Alaska, Brown joined the steamship department of George S. Bush & Co., customs brokers, which activity was taken over by the General Steamship Corporation when it was formed in 1920. Brown has since been continuously with this Corporation, and was appointed Local Manager in 1926.

with the staff of General Steamship Corporation in full confidence that their inquiries will always be handled impartially and in good faith.

Chartering Department

Whenever shippers desire to work full cargoes which cannot be economically handled by regular liner service, they find a world-wide contact available through the Company's Chartering Department.

This department was inaugurated early in 1923, up to which time practically all foreign flag chartering business to and from the Pacific Coast was done by New York and London brokers.

With his usual foresight, Scott recognized that with the offering of a world-wide chartering coverage, Pacific Coast merchants and shipowners would be given up-to-the-minute, competitive shipping and chartering intelligence, tuned to the development of Pacific Coast trade.

To provide this service, agreements were entered into with Messrs. Simpson, Spence & Young, one of the leading chartering firms of the United Kingdom and New York markets; and further direct working arrangements were established with cabling brokers on the Continent, in Scandinavia, South America and the Far East. At the present time the daily cables and teletypes bring the Chartering Department (and the principals it serves) into direct communication with all shipping centers throughout the world.

In 1927 Chartering Departments were also established in the branch offices of the General Steamship Corporation, in Seattle and Portland, and the Empire Shipping Company Limited, Vancouver B. C., to meet the demands of principals for a direct service. Each of the offices of the Chartering Department works directly by cable with the Firm's correspondence in other markets (and with other branches of the Firm) giving local clients quick and independent coverage of their shipping requirements.

The chartering service has provided stimulus to the fixing of tonnage on the Pacific Coast and the establishment of the Pacific Coast as one of the leading chartering markets. Now, after the passing of a quarter of a century or more, Pacific Coast brokers are fixing the bulk of the business originating in their territory.

The Chartering Department also conducts a ships' husbanding division which attends to the turn-arounds of tramp vessels calling at Pacific Coast ports for bunkers and/or loading or discharging under charter.

The department also maintains personnel experienced in the sale and purchase of vessels and is a recognized leader in this field.

From experience gathered over the years, the department has originated modern forms of charters and sale contracts specifically adapted to Pacific Coast business,

Vancouver

Vancouver office. Interior view with Passenger Department in foreground.

FRED H. CLENDENNING

President, Empire Shipping Co., Ltd., Vancouver, B. C., Most of Fred Clendenning's early career was with the Canadian Pacific Railway, with which he served in various capacities in the freight department for a period of 27 years beginning in 1898. On January 1, 1925, he resigned from the C. P. R. to take charge of the Empire Shipping Company, and is its President. He is also Director of many Steamship and allied companies in Canada.

F. C. GARDE

Vice-president Empire Shipping Co., Ltd. This Company is Canadian representative for General Steamship Corporation. His early experience in the freight and shipping business began in 1910 with the Canadian Pacific Railway where he started with the operating department in Nelson, B. C. He resigned in 1921 to join the staff of the Empire Shipping Company, which was formed that year.

CENTRAL AMERICA, PANAMA, COLOMBIA, VENEZUELA

THIS LINE . . . now in operation for three years . . . is the pioneer in the establishment of direct freight and refrigerator service between the Pacific Coast ports of U. S. A. and Canada, and the Caribbean ports of Colombia and Venezuela, including the shallow-draft port of Maracaibo. Also regular northbound service from Buenaventura and Central America to the Pacific Coast.

INDEPENDENCE LINE

COMPANIA NAVIERA INDEPENDENCIA, S. A.
PANAMA, R. P.

FLEET:
Three modern motorships,
DON ANSELMO · DON AURELIO · GLIMMAREN
Regular monthly sailings.

M/S GLIMMAREN

which are now in general use throughout the trade.

Shipowners the world over look to the General Steamship Corporation's Chartering Department for advice on sales, purchases and charters, and the husbanding of their vessels calling at Pacific Coast ports. In this connection the department acts as Pacific Coast agent for over two hundred shipowners and operators.

At all times, it is posted as to daily trends, latest fixtures, prevailing freight rates and cargoes, and is prepared to give such information and helpful counsel to foreign traders and shipowners. It also acts as agent for chartered vessels, and supervises the operation of loading and discharging, cargo stowage, securing of berths, bunkering, claims and other details in connection with such vessels.

Passenger Department

The General Steamship Corporation Ltd. also maintains a Passenger Department outstanding in its field. By reason of the ground floor location of its offices in each key city on the Pacific Coast, and its trained personnel, it is especially well equipped to handle this phase of the business.

Through the head office in San Francisco, branch offices direct their business through the various lines represented by General Steamship Corporation, thus controlling the efficient distribution of the passenger space to insure both the travel agent and the general public the most satisfactory and expeditious service.

The Passenger Department not only serves as General Agent for the numerous Pacific Coast Lines represented by the company, but also acts as General Pacific Coast Passenger Agent for the Delta Line, operating a fleet of luxurious streamlined passenger vessels from New Orleans to South America, and combination passenger and cargo vessels to West Africa; and the American and Export Lines, Inc. operating its new American-flag passenger liners to the entire Mediterranean in addition to acting as General Passenger Agents for the well-known Italian Liners *Saturnia* and *Vulcania*. Through its offices in Seattle and Portland, General Steamship Corporation also acts as General Passenger Agent for the French Line.

S. A. PAGE
Passenger Traffic Manager, San Francisco.
Stanley Page became affiliated with General Steamship Corporation in 1933 in the Passenger Department. Called to active duty with the Navy in 1941, Lieutenant Commander Page served as liaison officer with shipping companies. Following the war, he was associated with Pan World Airways and Interocean Steamship Company prior to returning to General Steamship Corporation in February of this year. Assisting Page in the San Francisco office are F. E. Short and Liliana M. Cerruti; G. H. Nickerson in Los Angeles; J. H. DuFeu in Seattle; and E. E. Anderson in Portland.

V. A. DRISCOLL
Local Manager, General Steamship Corporation, Portland.
After four years of successful selling experience that took Driscoll from Portland to San Francisco, down to Santa Barbara and back to Portland, he decided he preferred steamship transportation business. His application made to General Steamship Corporation in Portland was accepted July 1, 1923 and he has been employed there ever since. During the First World War he served in the Merchant Marine.

In its capacity as General Passenger Agents, the General Steamship Corporation also pioneered in establishing passenger travel on freighters with limited passenger accommodations. These are popularly known as "Vagabond Voyages," and continue to be in great public demand.

Communications Center

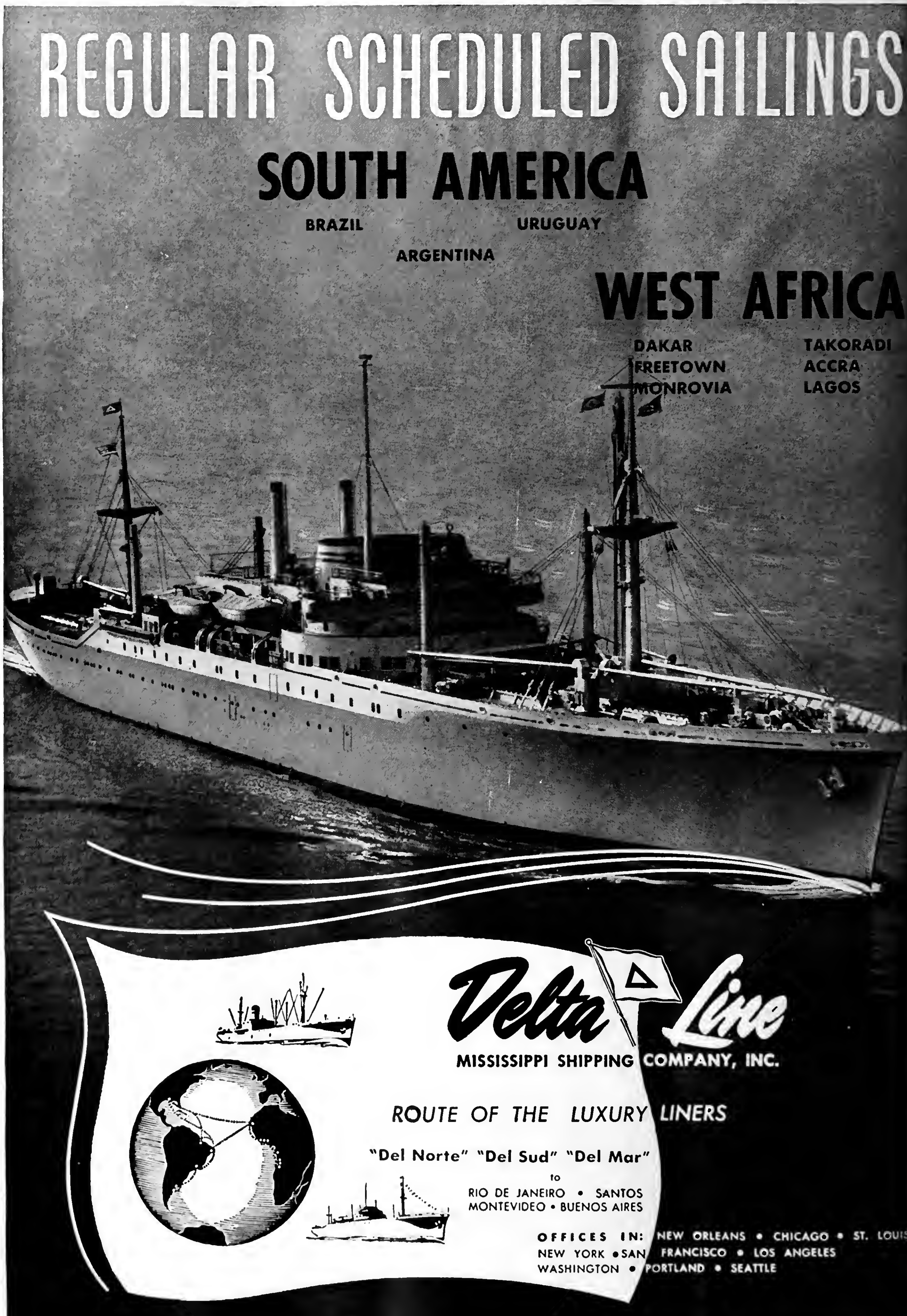
The Communication Department has been formed to give the Company a telegraphic center through which all incoming and outgoing telegrams, cables and teletypes are routed. This affords all officers and integral departments with continual service and instantaneous record of all telegraphic matter.

Formation of the communication department consists of directly connected teleprinters (RCA, Western Union, Globe Wireless and Mackay Radio Communication Companies) so that outbound telegrams and cables can be accurately and immediately channelled to any point in the world. Inbound traffic addressed to the company is likewise directly channelled over these machines eliminating necessity of any messenger service.

Two teletypes are employed to insure immediate contact 24 hours a day with any point in the United States.

All communicating machines are supplied with spirit hectagraph rolls which afford rapid copying by an electric duplicator. Copies of messages are then distributed to various departments via Lamson pneumatic tubes specially installed at several vantage points to insure immediate delivery to all concerned. This tube system is also used to rapidly transmit other important paper matter from one floor to another.

The San Francisco office also has a complete automatic telephone system in addition to a Flexifone system for rapid communication between departments.


REGULAR SCHEDULED SAILINGS
SOUTH AMERICA
BRAZIL
URUGUAY
ARGENTINA
WEST AFRICA
DAKAR
FREETOWN
MONROVIA
TAKORADI
ACCRA
LAGOS
Delta Line
MISSISSIPPI SHIPPING COMPANY, INC.
ROUTE OF THE LUXURY LINERS
"Del Norte" "Del Sud" "Del Mar"
to
RIO DE JANEIRO • SANTOS
MONTEVIDEO • BUENOS AIRES
OFFICES IN: NEW ORLEANS • CHICAGO • ST. LOUIS
NEW YORK • SAN FRANCISCO • LOS ANGELES
WASHINGTON • PORTLAND • SEATTLE

EDWARD T. CLENDENNING

Managing Director Empire Shipping Company, Ltd., Vancouver, B. C., Canadian representatives, General Steamship Corporation.

He joined the staff of the Empire Shipping Company in 1921, the year it was formed, and is its Managing Director.

WILLIAM J. SPURRIER

Washington, D. C. representative, General Steamship Corporation.

34 years experience in transportation and shipping, including serving the Government in Washington as a traffic and transportation expert, he was recalled to Washington January 1, 1946, as Assistant Chief Traffic Officer and later as Chief Traffic Officer in the supervision of the United Nations Relief and Rehabilitation Administration. Immediately upon completion of this work, on August 31, 1947 he assumed his present duties as agent for General Steamship Corporation in Washington, D. C.

WILLIAM G. DEVERALL

Eastern representative for General Steamship Corporation, connected with Texas Transport & Terminal Co. Inc., New York.

Deverall has had over 20 years shipping service on the Atlantic, Gulf and Pacific Coasts. Prior to his present connection, he was with the Grace Line, and during the war period was attached to the executive branch of the British Ministry of War Transport in New York.

This building at 432 California St., San Francisco, is a combination of stone and marble front in Italian Renaissance architectural design. It has been completely modernized and remodeled to house offices of the traffic, chartering, communications and passenger departments. It is the home office of the Corporation.

EDWIN A. KUECKER

President, Kuecker Steamship Services, Inc., Chicago, representing General Steamship Corporation in the Middle West.

Kuecker began as office boy with the Union Pacific Railroad's Chicago office, and went through various freight and travel positions including import and export. He was in charge of the Robertson Steamship Agency in Chicago, when he resigned in 1938 to become founder and president of the Kuecker agency.

Navigation History of Pacific Railroads

AMONG the interesting features of OIL LAMPS AND IRON PONIES,* a new railroad book dealing with the narrow gauge lines of the Pacific Coast, are the marine histories of four of the railroad companies concerned. Of the trio of authors, Shaw, Fisher and Harlan, much of the marine atmosphere was contributed by George H. Harlan, whose name is not unfamiliar to *Pacific Marine Review* readers as he has written many articles on ship conversion and repair for the magazine.

From the town of Ilwaco on the Washington bank of the Columbia River, the Ilwaco Railroad and Navigation Co. combined rail and steamer service from Astoria to Shoalwater (now Willapa) Bay, where the company also operated steamboats. The earliest vessel was the *General Canby* built in 1875 in South Bend, Washington, a vessel of ninety gross tons operating between Astoria and Ilwaco. The service rendered by this sidewheeler was augmented by the *General Garfield* and the *General Miles* in 1882, the latter vessel being a screw steamer of 130 gross tons. Also at this time the company added the sternwheeler *Montesano* which operated on Shoalwater Bay.

Additional vessels added to the company's fleet were the *Governor Newell* and the *Ilwaco* which served the narrow gauge line at Ilwaco. In 1891, Jacob Kamm, vice-president of the company designed and built the *Ocean Wave,* a vessel 180 feet long and admeasuring 724 gross tons. This vessel was sold soon after building to Carry W. Cook of Tacoma, Washington who took the vessel to New Westminster, British Columbia. She was bought by Captain John Leale of the Southern Pacific Co. and brought to San Francisco Bay in 1900 where she was sold to the Santa Fe Railway for their Richmond-San Francisco Service. The vessel ended her days on the Bay on the San Mateo mudflats in 1934.

The Ilwaco Railroad eventually abandoned its Ilwaco wharf since navigational difficulties were encountered due to shifting sand bars in the Columbia. The railroad, now in the hands of the Union Pacific, extended its line up the north bank of the Columbia thirteen miles, the extension involving a tunnel under Fort Columbia, which now permitted a shorter run from Astoria to Megler. The service was ultimately discontinued in 1930.

Two narrow gauge lines, prominent in the moulding of San Francisco were the North Pacific Coast R.R. and the South Pacific Coast R.R. The former, built in 1871 from Sausalito to Tomales, ran a dual ferry service from San Francisco to Sausalito and Point San Quentin. Commencing with the now legendary steamers *Clinton* and *Contra Costa,* the railroad company then refitted the elegant steamer *Petaluma of Saucelito* as the *Tamalpais,* a single ended vessel with two Corliss engine-driven paddle wheels. In 1877 the company added the *San Rafael* and the *Saucelito* to its service, both vessels being built by the North River Iron Works of New York City and reassembled on delivery by Steamer to San Francisco Bay. The *Saucelito* was burned at the wharf at San Quentin in 1884, and a new *Sausalito* was built about ten years later. The *Sausalito* was a double-ended boat, 1766 gross tons and 256 feet long. Shortly before the company sold its interests, another vessel, the second *Tamalpais,* was built by

George H. Harlan

the Union Iron Works, and this double-ended ferry served for forty years on San Francisco Bay. The *Sausalito* rammed and sank the *San Rafael* off Alcatraz island on the foggy night of November 30, 1901. One passenger and a horse were drowned in the mishap, one of the most severe and spectacular in the history of the bay. The accident served to give impetus to the plot of Jack London's *Sea Wolf.*

In 1876-7, Senator James G. Fair built his narrow gauge South Pacific Coast Railroad from Alameda to Santa Cruz, with ferry connection from San Francisco to Alameda Point. The first vessel to be built for the line was the *Newark,* a ferry with the largest paddlewheels on the bay. The wheels, 42 feet in diameter, were exceeded in size at the time only by the Pacific Mail Steamer *Montana* which vessel was reputed to have wheels 45 feet in diameter.

The *Newark* was followed by the *Bay City* (1878) and the *Garden City* (1879), both vessels being over one thousand gross tons measurement. The last of the vessels to be built for the Fair railroad was the *Encinal* built in 1888, and completed after the narrow gauge had been sold to the Southern Pacific. After this time the ferryboats belonging to the South Pacific Coast served both the Alameda and Oakland moles, until one by one they disappeared from bay service. Only the keels and a few frames of the Newark were retained when the

* This book will be available October 1.

ship was rebuilt into the present Southern Pacific Ferry *Sacramento* in 1923.

The farthest inland service of all was performed by the Lake Tahoe Railway and Transportation Company, a narrow gauge line which ran from Truckee to Tahoe City, Calif., a distance of a little more than fourteen miles. And in order that its passengers might see more of the lake, the company operated the beautiful little steamer *Tahoe*, built by the Union Iron Works in 1896. The vessel was knocked down in San Francisco and transported over the rails of the Central Pacific and the Virginia and Truckee to Carson City, Nevada, where the sections were transported by teams over Clear Creek

(Please turn to page 107)

Top: The beautiful twin-screw steamer "Tahoe," built by the Union Iron Works in 1896, shared with the steamer "Nevada" the chore of showing sightseers 'round Lake Tahoe. The trim little craft was sunk off Glenbrook in 1941 to save her from the scrappers' torch.

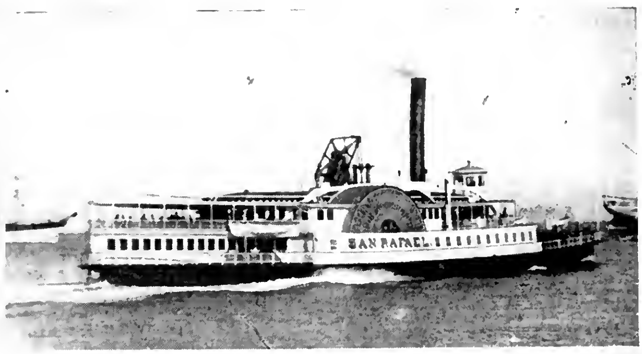
Center: The Steamer "T. J. Potter" of Portland, Oregon, meets the Union Pacific narrow gauge train at Megler (Washington) wharf about 1912. This railroad line was formerly known as the Ilwaco Railroad and Navigation Co.

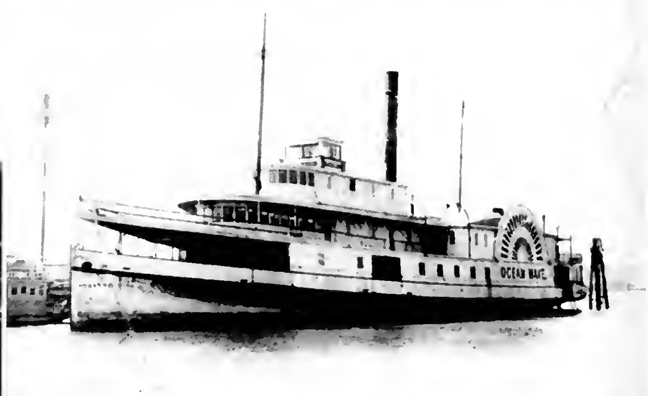
Bottom: The Steamer "Newark," her big side wheels 42 feet in diameter, ferried many a passenger on San Francisco Bay for the the narrow gauge South Pacific Coast R.R.

Top: The North Pacific Coast ferryboat "San Rafael," sunk off Alcatraz Island on November 30, 1901, made eighteen knots with her single cylinder engine and 50 lbs. steam pressure.

Center: The side-wheel steamer "Ocean Wave," built in 1891, served the narrow gauge Ilwaco R.R. & Navigation Co. in Washington and later the Santa Fe on San Francisco Bay during her varied career as a passenger carrier.

Bottom: The single-end ferry "Tamalpais," first boat of that name, racing the "Mary Garrett" down the San Francisco waterfront in 1888.





Plymouth Cordage Company

— 125 Years of Service —

Bourne Spooner, founder of Plymouth Cordage Company.

THE original charter of the Plymouth Cordage Company was signed on June 12, 1824. The ropewalk which Bourne Spooner, the founder, built back in that year, still stands on the original site at Nathan's Brook in Plymouth, Mass., but the seven horsepower supplied by this brook has long been inadequate for the plant that grew out of this modest start.

The Company was born into a highly competitive industry. There were nearly 200 ropewalks scattered along the eastern coast between Maine and Kentucky—many of them in operation for many years. This newcomer of 1824 had to establish itself and the quality of its product rapidly if it were to survive.

Agents were set up rapidly in important markets like Boston and New Bedford. The big Maine markets for cordage were sold through Boston agents for the first few years but later there were Plymouth Cordage agents in every important Maine shipbuilding center.

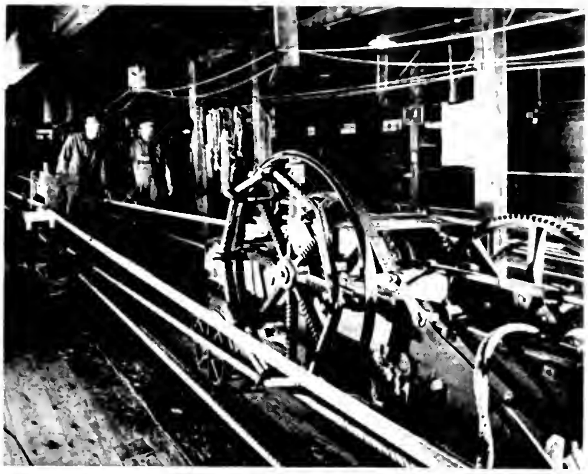
Thirty-three acres of floor space are now in use. Three great modern mills hum with power-driven breakers, draw-frames, spinners, formers, layers. Long concrete warehouses, power plant, maintenance shops, office building and other structures supplement these mills.

And operations have expanded to other cities. A new plant was started in Welland, Ontario, Canada, in 1909. In 1938 the Consumers Cordage Company was purchased. This wholly-owned subsidiary operates a mill at Dartmouth, Nova Scotia. The Federal Fibre Mill at New Orleans, La., became part of the Plymouth Cordage Company in 1947.

John Donley, a typical ropemaker of the early 1800's. He began as an apprentice at the Plymouth Cordage Company in 1830 and finally retired 64 years later in 1894.

The next major change was 14 years later, when the use of cordage machinery entered the picture. Then a

The Plymouth Cordage Plant about 1850, 26 years after the founding. The original plant was the old ropewalk located in the building found in the left-hand corner of the picture.



The old ropewalk still stands and this picture shows it in actual use when it was reopened to meet the emergency requirement for rope during World War II. It has since been closed down again.

new and different building was needed for the spinning machinery operated by steam power. This was built in 1838.

By 1885 four new buildings had been added, but on January 3, 1885, a fire destroyed two of the three mills. The remaining mill was torn down and there was a complete rearrangement of the Company's mills and power plant. All that remained was the old ropewalk.

Rebuilding of the plant came at the beginning of one of the company's times of heaviest growth. A new binder twine mill was built in 1899. No. 3 Mill was added in 1907 and was the last major expansion in floor space at Plymouth, except for warehouses and needed utility buildings. From that time on, additions in plants were made in other cities.

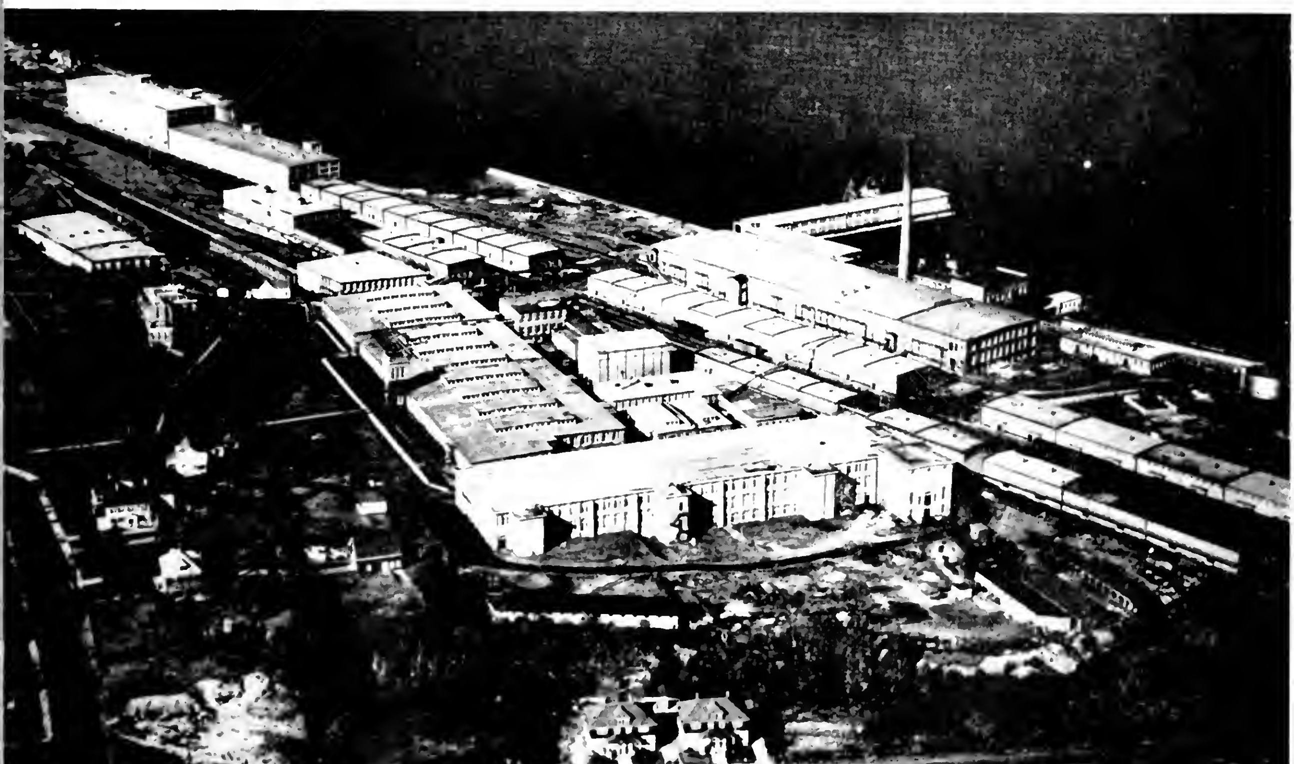
Bourne Spooner, first guiding spirit and operating head of the Plymouth Cordage Company, served the

Ellis W. Brewster, President of Plymouth Cordage Company.

Company from 1824 to 1870 when his place was taken by his son, Charles Walter Spooner. Charles Spooner

(Please turn to page 107)

An aerial view of the principal operation, the plant of the Plymouth Cordage Company at Plymouth, Mass.



News Flashes

ARMY TRANSPORT CONVERTING C-4s

The Army Transportation Corps, San Francisco, is calling for bids for special conversion of three C-4 transports. The work will consists of changing certain troop quarters into passenger quarters. Bids are expected to be opened Sept. 19.

* * * * *

ALEXANDER BIDS DELAYED

The opening of bids for the construction of two 25 knot trailer-ships for Pacific Coast Steamship Co. (H. F. Alexander) have been delayed to Sept. 26.

* * * * *

DELTA LINE MOTORSHIP BIDS SET

Bids on Mississippi Shipping Company's (Delta Line) proposed passenger cargo motorship will be opened Sept. 21 (postponed from Aug. 22).

* * * * *

BETHLEHEM PLANNING ORE CARRIERS

Bethlehem Steel Company is reported to be planning two 30,000 ton ore carriers for its own use. They will be built at Bethlehem's Sparrows Point Yard.

* * * * *

BIDS ON PROTOTYPE

As reported in out August "Flashes", Ingalls was low bidder on the prototype cargo vessel for the Maritime Commission. All bids follow: Ingalls, $4,864,000; Newport News, $5,150,000; Gulf Ship, $5,934,000; Sun Ship, $5,994,518; New York Ship, $6,432,000; Bethlehem Sparrows Point, $6,570,000; Bath Iron, $6,826,995; Bethlehem San Francisco, $7,498,000.

No date has yet been set to begin construction, and commission officials said a contract may not be awarded for some time.

* * * * *

NAVY DOES NOT EXPECT TO DIVERT SHIPYARD WORK

Rear Adm. William M. Callahan, Chief of the recently established unified Military Sea Transportation Service (M.S.T.S) announced to the press that the pending take-over of Army transports on Oct. 1 will not affect the business of private shipyards engaged in overhaul and repair of the 200-odd vessels to be shifted to Navy management and that the same shipyards and other facilities employed by the Army for maintenance of its ocean-going craft.

KORT NOZZLE RELEASED

Dravo Corp. of Pittsburgh has relinquished its exclusive American rights to the fixed Kort Nozzle. Under an agreement with the Office of Alien Property of the United States Department of Justice, which holds the German-owned patent, Dravo surrendered its exclusive rights in advance of expiration of the patent.

* * * * *

STILL CHANCE FOR BIG RESERVE SHIP PROGRAM

A Senate Appropriations sub-committee is now considering a special fund of $25,000,000 for the immediate repair of 134 ships in the lay-up fleets, including 34 in Suisun Bay, 10 at Astoria, and 9 at Olympia. Senator Magnuson of Washington is carrying the ball.

* * * * *

"LIGHTNING" GOES TO TODD

The big bottom-repair job on the M. S. LIGHTNING was awarded on its low bid to Todd's Alameda Yard. Completion is scheduled for December.

* * * * *

MANY SHIP REPAIR JOBS COMING IN

West Coast shipyards are noting an increasing number of drydocking and general repair jobs developing. As of date of writing, Bethlehem's San Francisco Yard had nine vessels under contract. They were the tanker SOLANO, dredge TEXAS, M. V. ROLANDO, S. S. YOUNG AMERICA, M. V. DANSBORG, M. V. TIDEWATER, Navy Tanker MISSION LORETO, S. S. HERMAN MELVILLE, and Army Transport SERGEANT SHOUP. The MELVILLE is at Stockton and the SHOUP is at the Army Supply Base, Oakland.

* * * * *

ROTTERDAM PORT BUILDS WORLD'S LARGEST RADAR SYSTEM

Before the end of the year, the Port of Rotterdam in the Netherlands will begin operating an extensive radar system, consisting of five to seven radar stations along the eighteen-mile New Waterway to the North Sea. When completed, the Rotterdam radar installation will be the largest in the world, making it possible for ships to move through the New Warterway in all kinds of weather, including the densest fog.

* * * * *

SUEZ CANAL REDUCTION ASKED

In a request directed to the American Representative on the Directorate of the Suez Canal Company, the National Federation of American Shipping today reported that it had supported the request of British shipowners for a reduction of Suez tolls which are presently costing American shipowners about $6,000,000 per year.

* * * * *

BIG STANDBY WAR ORDERS RUMORED

The National Security Resources Board is expected to authorize <u>plans</u> for large production of many vital war tools such as cutting machines, gauges, small motors and bearings. The plans are to be of a standby nature. Actual manufacture is not intended at this time.

Hust vs. Moore-McCormack

(Continued from page 56)

general agent as an employer. The Court did not perceive how the Clarification Act changed this liability.

The Court concluded that the Clarification Act afforded no basis for distinguishing the present case from the Hust case, and that the reasoning in the Caldarola case, which was decided after the Hust case, was and is sound, and therefore calls for the rejection of the basis of the Hust case. The Court stated that they were unable to perceive in the statutes relating to sailors' rights or the history behind their enactment any legislative purpose to create in seamen employees of the United States through the War Shipping Administration a right to enforce tort claims under the Jones act against others than their employers or any recognition that such right ever existed. The Jones Act was welfare legislation that created new rights in seamen for damages arising from maritime torts. As welfare legislation, this statute is entitled to a liberal construction to accomplish its beneficent purposes.

The Court refused to disregard the plain and rational meaning of the words "employment" and "employer" in order to furnish a seaman a cause of action against one completely outside the broadest lines or definitions of employment or employer. The Court said:

> "We have no doubt that under the Jones Act, only one person, firm, or corporation can be sued as employer. Either Cosmopolitan or the Government is that employer. The seaman's substantive rights are the same whoever is the employer. Under the Jones Act, his remedy permits him to demand a jury trial. If the Government is the employer, his remedy is in admiralty without a jury."

The Caldarola case, as I have already said, undermined the foundations of Hust. Caldarola held that the general agents under the standard form contract were not in possession or control of the vessel so as to make them liable under New York law to an invitee for injuries arising from negligence in its maintenance.

The Court properly said in the Cosmopolitan case:

> "We do not think it consistent to hold that the general agent has enough 'possession and control' to be an employer under the Jones Act but not enough to be responsible for maintenance under New York law."

Vicarious liability to anyone must be predicated on the relation which exists under the standard form agreement and the shipping articles between the general agent on the one hand, and the master and crew of the vessel on the other. Caldarola held that this relation was not one which involved that proximity necessary to a finding of liability in the general agent for the torts of the master and crew. The Court said that they could perceive no reason why the rationale of that holding could not apply with equal force to a suit under the Jones Act. If the principles of agency under common law were applied to this problem, the conclusion would necessarily be the same as the Court has properly determined in the Caldarola case. In the instant case, the majority of the Court specifically overruled the Hust case even though it expressly recognized the undesirable result that might follow because of a loss of rights under the Suits in Admiralty Act (suits against the United States), which necessarily follows one's reliance upon the Hust case.

The Court examined the Standard Service Agreement once again and concluded that no single fact could determine the employer, but the venture as a whole would have to define the conclusion. It was clear from an examination of the scope of the contract that the general agent did not undertake to give orders or directions as to the management of the ship when on a voyage. The general agent, on the other hand, acted merely as a ship's husband. The agreement's language makes that conclusion evident as well as actual practice. The ship's husband has the shoreside business of the ship to attend to, and beyond that his obligation ceases.

At the time of the wartime requisition of the privately owned merchant fleet the government administrative agencies concerned gave careful study to the question of whether the crews were to be employees of the shipping companies or of the United States. There were outstanding many collective bargaining agreements between the private shipping companies and the maritime unions. It was manifestly undesirable to disturb these existing agreements and for the Government to negotiate new ones. Yet it was essential that the masters and crews be government employees in order to obviate strikes and work stoppages, to insure sovereign immunity for the vessels, and to preserve wartime secrecy by confining all litigation concerning operation of the vessels to the admiralty courts where appropriate security precautions could be observed. The service agreements, therefore, provided that the officers and men to fill the complement of the vessel should be procured by the general agent through the usual channels upon the terms and conditions customarily prevailing in the services in which the vessels were to be operated. These men, however, were to be hired by the master of the ship and were to be subject to his orders only. The responsibility of employing the officers, so the Regulations show, was vested exclusively in the master, and the men so hired became employees of the United States and not of the general agent.

The opinions in the *Cosmopolitan Shipping Company* case and other related cases were prepared by Justice Reed, and in each case, Justices Black, Douglas, Murphy and Rutledge dissented. Each of the dissenting Justices mentioned was responsible for the majority decision in the Hust case.

Todd Buys Plant in New Orleans

Todd Shipyards Corporation's affiliate, Todd-Johnson Drydocks Inc., New Orleans, has completed negotiations covering the purchase of the fully equipped ship repair shop of the Ajax Machine Works, located at Tchoupitoulas and 8th Streets, New Orleans.

Todd-Johnson is now able to offer steamship operators complete round-the-clock service for both underwater work and quick turn-around voyage repairs. Operations at this new plant will commence on or about October 1, 1949. The Ajax Machine Works, although divesting themselves of the ship repair shop, will continue that branch of their business as agents for various products and services at a new location.

Left to right: E. S. Hochuli, Director of Public Relations, General Petroleum; Oliver Meek; E. M. Gray, Division Manager, Northern California, for General Petroleum; Stanley Dollar.

Stanley Dollar, Jr. Honored

The records made in the recent speed boat races by R. Stanley Dollar, Jr., in his *Skip-A-Long of California* were given enthusiastic recognition by the General Petroleum Company in a party in honor of Dollar and his copilot Ollie Meek. The party, attended by press representatives of the Bay Area, was held in the Clift Hotel, San Francisco, and was presided over by E. M. Gray, Division Manager for Northern California for the hosting company.

In the busy month of racing, *Skip-A-Long* came through as follows:

July 2—GOLD CUP RACE, Detroit, Michigan. Finished 2nd. Set 90 mile Gold Cup speed record of 75.599 mph. 3 heats of 30 miles each.

July 4—DETROIT MEMORIAL Race, Detroit. Won. Henry Ford Memorial Trophy (perpetual) with replica. Set 45 mile speed record of 73.610 mph. 3 heats of 15 miles each.

July 17—PERCY JONES GENERAL HOSPITAL TROPHY Race. Won. Percy Jones General Hospital Trophy. Set 2½ mile lap record of 86.157 mph on third lap of last heat. Set 15 mile heat record of 84.506 mph. Set 45 mile record of 83.260 mph for 2½ miles course 3 heats of 15 miles each.

August 1——HARMSWORTH TROPHY Race, Detroit. Won. Harmsworth Trophy. Set world heat record of 94.285 mph 42 nautical miles (48.3 statute miles).

August 1—DETROIT MARATHON RACE, Detroit. Won. Detroit Marathon Trophy (perpetual) with replica. Won Fred M. Alger Trophy for fastest lap. Speed 87.632 mph. 7 nautical mile lap (8.05 statute miles). Set speed record of 75.091 mph (84 nautical miles) for 100 mile marathon with a pit stop of 4 min. 35 sec. for refueling.

Surridge Retires From APL

C. T. Surridge, an outstanding international authority in the Freight Traffic field, concludes a 53-year career in Pacific shipping with his retirement as Manager of American President Lines' Freight Department. Holding a master's certificate for both steam and sailing vessels, Surridge has been a member of APL's Freight Department for over 26 years and for the past 6½ years has been its manager.

Recognition of Surridge's eminence in the freight traffic field was accorded him recently when the Western Management Association awarded him their certificate of merit for outstanding work in foreign trade for the year 1949.

Surridge's shipping career began in 1896 when he went to sea as a Cadet. He worked himself up through the various licensed grades to Chief Officer, and in 1904 he left the sea and joined the old Pacific Mail Steamship Co. as Freight Clerk. From 1906 to 1908 he served as Chief Clerk for the Northern Navigation Co., and from 1909 to 1920 he was Agent in Alaska for a number of

organizations, including Northern Navigation, American Yukon, Northern Commercial Co., Wells Fargo and Amercian Express Company.

From 1920 to 1923, he served as General Agent for the China Mail Steamship Co., and General Manager for China Pacific Steamship Co., and was stationed alternately in Hongkong and San Francisco.

He joined the Robert Dollar Co. in 1923 as Chief Clerk of the Freight Department where he served continuously for 26 years. In 1943 he was made Manager of the Freight Department.

J. H. Sheusner Chief Engineer at Enterprise

J. H. Sheusner

The appointment of John H. Sheusner as Chief Engineer was recently announced by Paul I. Birchard, vice-president of Enterprise Engine & Foundry Co. in San Francisco. During his five years with the company as Chief Design Engineer, Sheusner has been in charge of all new design developments incorporated in the complete line of Enterprise Diesel Engines. His new post encompasses the engineering activities of the Oil Burner Division and the Food Process Machinery Division, as well as marine and stationary diesel engine operations.

Marine Exchange Committee Meets

Marine Exchange Committee meets in San Francisco to hear reports on sales tax, ship construction and consolidation services, and to hear an address by Adm. Nuber on the possible disruption of West Coast business under the consolidation of Army and Navy transport services.

Top picture. Clockwise around the table: Albert V. Gatov, Pacific American Steamship Association; Julian Arntz, Bethlehem; John Parker, American Maine Paint Co.; Heinie Gelhaus, Todd Shipyards; M. L. Chaban, The Chaban Co.; Ed Snyder, Moore Dry Dock Co.; Lowell F. Jett, Cordes Bros.; Ernest Johnson, Allen-Pacific Co.; Felton Howe, Weeks-Howe-Emerson Co.; T. D. MacMullen, Pacific Marine Review; Adm. H. D. Nuber, Regional Director, National Security Industrial Association; Louis Ets-Hokin, Chairman, Ets-Hokin & Galvan; M. A. Cremer, Marine Exchange; Leighton Stone, Swett-Stone Co.; Ed Hough, Hough & Egbert Co.; B. N. DeRochie, Pacific Marine Review; Jack Foisie, The Chronicle; Edgar Martin, Edgar Martin Co.; Jeff Wilson, Pacific Shipper.

Bottom picture. Left to right: Jim Crough, Lidgerwood Co.; Paul Faulkner, Pacific Marine Review; T. S. Tulien, Johns Manville Co.; Ray Cooper, Fairbanks Morse; a reporter; Harry Nagle, Fairbanks-Morse.

Merchant Seamen of Embarcadero Y.M.C.A., San Francisco

By M. A. CREMER*

WHEN the first Y.M.C.A. branch was built on the Embarcadero, it was evident that due to its location, certain of its facilities would be used by men of the merchant marine. The Embarcadero Y.M.C.A., therefore, can look back on work with seamen since its founding in 1908. Since occupation of the present building in 1926, accommodations for them have been greatly enlarged.

Early in 1947 it became evident that with the closing of the United Seamen's Services, there would be a need for a new program for seamen. The Board of Managers of the Embarcadero accordingly decided to institute a complete new program and engaged a program secretary, Ragnar Kjeldahl, to carry it out. In conformity with Y.M.C.A. policies, the Board of Managers authorized the setting up of an Advisory Committee for work with Merchant Seamen.

The committee's objects are:

1. To study the problems and needs of the men as regards use of their time ashore, particularly their moral, cultural and social interests, and to make recommendations in planning a program and services toward meeting these needs in accord with the purposes of the Y.M.C.A.

2. To suggest to the Board of Managers procedures and policies regarding work with merchant seamen.

3. To acquaint the shipping industry and seamen's unions with the Y.M.C.A.'s activities and ideals, and to inspire confidence in its Christian approach and aspect.

4. To interpret the needs of seamen to the community at large.

Thirty-six men and women representing the shipping industry, business, labor, woman's organizations and churches, and members of the consulates of Norway, Sweden, Denmark, Holland, Great Britain and Canada, comprise the committee at the present time.

The plan was to create a program of social fellowship, education, sports and recreation, to counsel in personal and spiritual problems, and above all to express the Y.M.C.A. philosophy of the Christian way of life. The committee therefore formed subcommittees concerned with the various aspects of its activities.

Merchant seamen in the port were invited to attend several meetings with the purpose of having the men themselves state the type of programs they would like to have. After several discussions the men decided to form a merchant seamen's club for the purpose of encouraging social fellowship, sports, education and recreation, the club to be of service to merchant seamen of any nation. As time went by, the members asked that a Y.M.C.A. membership fee be established of $4.00 a year or $1.00 for 3 months. It was believed that when and if similar clubs should be established in other ports, membership could be reciprocal.

Merchant Seamen's Club Auxiliary

Since the average merchant seaman is in port a very short time, it was decided to ask the hostesses if they would form an auxiliary which would have the major responsibility of carrying out the social programs planned. Whenever possible, representatives of the men would meet with the girls and give all possible help. Under the direction of Miss Evelyn Haese, Associate Secretary, the auxiliary was organized.

Programs

The programs fall into two classifications: one, those strictly for merchant seamen and two, joint programs open to merchant seamen, Defense Service personnel, and residents of the building.

In classification one, there is a dance and floor show every week and sports programs.

In classification two, under joint programs there is a Sunday morning fellowship hour, predominantly a merchant seamen's program; classical music programs, and a Bridge Club. There is also a co-ed night, for joint participation in sports activities, and a merchant seamen's forum. A more extensive forum series is being planned.

Special Programs

From time to time there have been organized picnics and conducted tours of the city for merchant seamen.

In addition to the foregoing programs, there are available attractive

O. C. Hansen, Chairman of Board of Managers of Embarcadero Y.M.C.A.

* Chairman of the Advisory Committee for Work With Merchant Seamen of the Board of Managers of the Embarcadero Y.M.C.A., and manager of the Marine Exchange.

M. A. Cremer

Chaplain Ragnar (Ray) Kjeldahl

rooms at reasonable rates, lounges, writing room, safekeeping of money and papers, baggage room, tailor shop, barber shop, restaurant and soda fountain, and also a travel bureau where seamen get the same reduction in railroad fares as the military personnel.

The Physical Department is open to merchant seamen. If they live in the building the Physical Department is free. If not, the charge is 75c for non-members and 25c for members of the Merchant Seamen's Club.

Personal Problems

Counseling plays a great part in our activities. If the problems are such that we cannot handle them, we try to refer them to churches or agencies that can help in solving them.

Other Problems

Social welfare funds are small. The sub-committee on social welfare has cooperated with Public Welfare, Salvation Army, Red Cross, Travelers Aid and various committees of the Community Chest and others in the city. The status of merchant seamen is not clearly understood by the community, and two years of work in this field have produced little result.

Visiting Ships, Hospitals

From time to time men have been visited on the ships and also in the hospitals, but most of the hospital visiting has been done by the Women's Organization for the American Merchant Marine hospital visitor, Mrs. Oscar Beyfuss. Visits to prisons have fortunately been very few, only five men having requested our help.

Cooperation With Other Groups

From the beginning of our program the local Norwegian group has given us their complete cooperation. With the coming of Egil Roed as secretary for the Norwegian State Welfare Association, a special committee of that association was formed with Kjeldahl as an advisory member representing the Embarcadero Y. M. C. A. Mutually we have gained in our fellowship, and by using each other's facilities we have covered a much broader field. There is now a move to establish a similar committee on behalf of the local Swedish group, also with Kjeldahl in a similar capacity. We hope that representatives of other nationals will do the same and thus cover the special needs of their respective nationals as well as cooperate in the overall programs.

Recently Kjeldahl was appointed Port Chaplain to Merchant Seamen, Port of San Francisco, by the San Francisco Council of Churches. Following upon this action, an association of chaplains to merchant seamen is in the formative stage with representatives from the Scandinavian Sailors' Home, the Norwegian State Welfare Association, the Norwegians Seamen's Church, the Scandinavian Seamen's Mission, the Salvation Army and others. It is hoped that through this association we shall be able to secure needed assistance and that there can be developed a united front in correcting misinformation and indifference on the part of the community.

Looking Ahead

Our plan is to utilize every effort toward interpreting our program to the shipping industry, to the unions, and to the community at large. Another phase of our future work must be to interest other ports in establishing similar clubs. The Armed Services Y.M.C.A. has become a vital factor for the military personnel wherever they may be. Military personnel are usually stationed for some time in the neighboring military establishments and thus can take more part in the planning of their programs. Not so with the merchant seamen. Some ships will be in port for only a few hours. The men therefore cannot take the part they would like to, but must rely on us to do the planning.

Embarcadero Y.M.C.A., San Francisco's waterfront.

San Francisco Port Authority Projected

Frank E. Feliz, of San Francisco, has been appointed Executive Secretary for the Fact-Finding Committee of the California State Senate to establish a Port Authority for San Francisco Bay.

Feliz has resigned as assistant to the executive vice-president and general manager of the San Francisco Bay Area Council, where he has been in charge of organization development and public relations since the Council program started in 1946.

Frank E. Feliz

The State Senate Interim Committee, of which Senator Jesse Mayo of Calaveras County, is chairman, is charged with the responsibility of developing essential facts concerning the prospective need for a Port Authority to serve world trade, shipping and related activities in the San Francisco Bay Area. It will be a fact-finding committee with an objective viewpoint in all its studies and hearings. Its primary purpose is to serve the best interests of San Francisco Bay and the counties of Northern California, where there is a mutual stake in the growth and development of Bay Area port and terminal operations to serve the expanding economy of the region.

In addition to Mayo, Senators Arthur Breed, Jr., Alameda County; George Hatfield, Merced; Charles Brown, Inyo County; Harold J. Powers, Modoc; Thomas Keating, Marin; and Ben Hulse, Imperial, comprise the Senate Committee.

A San Francisco resident for 20 years, Feliz' former home was Santa Rosa, California. After attending Stanford University he joined the *San Francisco Examiner,* later entering the public relations and advertising fields.

He was in shipping and world trade development posts with major trans-Pacific and worldwide steamship lines for five years and has served as secretary for the Bay Area World Trade Promotion Committee, for the past two years. He also was in charge of arrangements for the 1948 Bay Area World Trade Institute.

Sperry Opens West Coast Radar School

The Sperry Gyroscope Company recently announced the opening of their West Coast Radar School for the purpose of instructing shipboard personnel in the operation, theory and maintenance of Sperry Radar. The course is of 5 days duration with a Radar Certificate being issued to the student upon completion. Radar classes are held every fourth week at 525 8th Street, San Francisco 3. The date of the next starting class is October 10, 1949 followed by a two week Gyro Compass class October 17, 1949 and a one week Loran class October 31, 1949. The cycle then will repeat itself every four weeks. These courses are all free, with the necessary texts provided to the student.

For further information and registration call MArket 1-3262 or write Marine School, Sperry Gyroscope Company, 525 8th Street, San Francisco 3.

SOPAC Gets "Lightning" Job

Sopac Ship Maintenance, Inc., 168 Battery St., San Francisco, has been awarded the contract for tank cleaning on the motorship *Lightning*, now at Todd's Alameda yard for a major repair job.

Federal Paint Executive Dies

Joseph M. Howland, a Vice-President and Director of The Federal Paint Company, Inc., 33 Rector Street, New York, died on August 12, 1949 in his home, 96 New England Avenue, Summit, N. J. He would have been 61 in October.

He started his business career with his uncles, the McCaldin Brothers, a well-known firm in New York who handled ships' dunnage and did carpentry work, and who also operated a fleet of towboats.

Some thirty years ago he joined The Federal Paint Company, Inc. and traveled extensively in the interests of the Company. He was active in its affairs until about three months before his death.

He was a member of The Whitehall Club, Downtown Athletic Club, Maritime Assn. of the Port of New York, Society of Naval Architects and Marine Engineers, The Propeller Club of the United States, Rudder Club, Canoe Brook Country Club, and the Foreign Chapter, Oslo Golf Klub.

Maritime Commission Moves at Seattle

Effective Sept. 6, the office of the U. S. Maritime Commission at Seattle will be located in the New World Life Building, 618 Second Ave.

Golf Time

The end of the summer usually sees a flurry of golf clubs, at least of maritime variety; in San Francisco, the Port Stewards and the Propellers held Golf Tournaments on consecutive Fridays, August 26 and September 2. The Port Stewards' affair, held at Green Hills Country Club for the fourth year, drew 120 golfers and well-wishers, mostly the latter, and followed up with a banquet and appropriate stag entertainment.

Master of Ceremonies was Gene Blank, with Gil Nelson and Jack Bolts on the prizes, Paul Babcock on tickets, and Frank Ingham arranging the groaning board. John Pruner gave a helping hand as official golfing authority, and conducted the hole-in-one contest. The beautiful J. J. Robinson Memorial Cup went this year to Frank Cannon of Matson for low net among the Port Stewards participating.

Next month: The Propellers.

At Port Stewards' Golf Tourney.
Top, left to right: Joe Granville, Hillcone S. S. Co. (score, 98); Hal Marshal, United Fruit Co. (score, 99); Jack Bolts, Luckenbach S. S. Co. (score, 91); Ray Cedar, C .J. Hendry (score, 85).
Below: Gene Blank, master of ceremcnies (left), and Ray Luce, steak maker.

Frank Patrick Cannon, winner of this year's trophy for low net at Port Stewards' fourth annual golf tournament. The cup is donated by American President Lines in honor of the late J. J. Robinson.

Revision of Wire Rope Standards

The National Bureau of Standards announces that a revision of simplified Practice Recommendation R198-43, Wire Rope, has been proposed by a Standing Committee, for reference by the Bureau to all interests for comment, acceptance or both.

The proposed revision, which adds a new table and effects a further reduction in variety of stock items, includes sizes, constructions, grades and breaking strengths of the vast majority of tonnage of wire rope.

General adherence to the 21 tables shown in this recommendation will result in a net reduction in variety of stock items, from 987 to 657, or 33 per cent. The major production and use of wire rope and, therefore, the predominant tonnage, is covered by 4 different rope-constructions, where the reduction in variety is from 352 stock items to 182, or 48 per cent.

Since as many wire-rope users as possible should have an opportunity to examine the proposed revision, the readers of this announcement are invited to make known their interest by writing to the Commodity Standards Division, National Bureau of Standards, Washington 25, D. C. The names of all firms that are not already on the Bureau's mailing list of firms will be added immediately.

A big corporation is more or less blamed for being big, but it is only because it gives service. If it doesn't give service it gets small faster than it grew big. *W. S. Knudsen.*

Essner Retires from Bethlehem

E. F. Essner, who retired August 1 as executive in charge of Shops and Facilities at the San Francisco Yard of Bethlehem.

After almost fifty years of service, E. F. Essner, one of the foremost West Coast authorities on heavy machine shop, shop and foundry work, and a man who has been actively associated with the development of metal trades in the marine field in the Bay Area for many years, has retired from his position as Assistant to the Manager and Executive in Charge of Shops and Facilities at the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division.

Essner started work at the San Francisco Yard—then the old Union Iron Works—on October 16, 1899, as an apprentice machinist. After winning his journeyman's ticket, he served in the machine shop until 1909 when he was made Assistant to Foreman. Three years later he was made Foreman.

By 1915 Essner became superintendent of shops, a position he held until 1931. At that time he was made superintendent of yards and shops and of Hunters Point graving docks, which were Bethlehem-owned in those days. In 1941 he was made general superintendent and in 1943 he became assistant to T. C. Ingersoll, manager of the yard, the position he held at his retirement.

His many accomplishments at the San Francisco Yard are highlighted by his supervision of the building of the 3,000-HP diesel engine for the Motor Tanker *Lio,* largest marine diesel ever built on the Pacific Coast.

New Allis-Chalmers Double Suction Pump

Construction features of Allis-Chalmers Type S, single stage, double suction pump, developed to serve a specific need for high efficiency and low maintenance, are described in a new 24-page bulletin released by the company.

Built for the particular pumping jobs for which they have been sold, Type S pumps are being used in almost every industry. The bulletin carries tables of available sizes, approximate dimensions and head capacities, tells how to figure pumping head, and tabulates friction loss for water per 100 feet of pipe.

Installations utilizing these pumps, according to the bulletin, include filtration and sewage plants, pumping stations, quarries, paper mills, steam power and chemical plants, and on board ship.

Copies of "Allis-Chalmers Type S Single Stage, Double Suction Centrifugal Pumps," 08B6146A, are available upon request from Allis-Chalmers Manufacturing Co., 1220 S. 70th St., Milwaukee, Wis.

Eby Vice-Pres. of Moore-McCormack

Ivan D. Eby, below, was recently elected Vice-President of Moore-McCormack Lines. He joined the company in 1920 and during World War II was directly responsible for the maintenance and engineering efficiency of a fleet of more than 150 ships when Moore-McCormack transported over 754,000 troops and carried 34,410,111 tons of war cargoes.

Robert S. Ogg

łobt. Ogg Appointed :ducational Director ıf Diesel Engine Ⅵanufacturers Assn.

Robert S. Ogg was recently appointed educational director of the)iesel Engine Manufacturers ıssociation.

Ervin L. Dahlund resigned from ıis position on June 1 to become ıe chief engineer of the Diesel ngine division of Fairbanks, Morse : Co. at Beloit, Wisconsin.

Ogg was formerly with the ngineering department of the ima-Hamilton Corporation, Hamton, Ohio.

A large part of Ogg's time will e spent with the accredited meıanical engineering schools of the ɔuntry. The rest will be with the ngineering departments of the)iesel engine builders and the fortyne manufacturers of parts, accessoes and oils for Diesel engines that :e assisting with this educational rogram.

ᴾlastics n Ship Fitting

The Paulsen - Webber Cordage orporation today revealed a new se for plastics in ship fitting. They :e currently supplying a quantity f chair anchors braided of plastic ɔrd for use in place of the metal ıains usually employed in dining ıloons. The cords, which have a ıyon core with a white Koroseal ɔating, are as strong as chains, ıuch handsomer in appearance and ıieter. They are intended for the *African Enterprise* and the *African Endeavor*, now being built for the Farrell Lines by the Gulf Shipbuilding Company at Chickasaw, Alabama. Similar orders are in production for two more ships now under construction in the Bethlehem Steel Shipyard, Sparrow's Point, Md., for the Gulf Oil Company.

De Laval Engineering Handbook

A new edition of the De Laval Engineering Handbook recently came off the press. The Handbook is a useful source of practical information on the design, operation and installation of pumps, turbines, compressors and gears; the first edition of this book was well received throughout industry.

The book is divided into six main sections: 1. Mathematical, mechanical and fluid information of a general nature applying to more than one of the following sections. 2. Steam turbine data. 3. Centrifugal pump data. 4. IMO pump data. 5. Compressor, blower and exhaust data. 6. Helical reduction gear data. 7. Worm reduction gear data.

Copies of the Handbook are available at two dollars each from the Advertising Department, De Laval Steam Turbine Company, Trenton 2, New Jersey.

Keep Posted

New Equipment and Literature for Yard, Ship and Dock

Fluid-Motor Operator for Valves

Crane Co., Chicago, has announced a simplified fluid-motor operator for gate valves. This new design makes possible extensive use of motor operated valves, since the actuating unit can be easily adapted to standard valves or to valves already installed. This previously has been a virtual impossibility, for motor-operated valves have customarily been made up on special order to the requirements of the installation.

When the valve gate reaches the end of its travel in either direction, the motor merely stalls, still under pressure. There can be no leakage, and shut-off devices are unnecessary.

The valves can be operated by a wide range of liquids or gases at pressures from 40 to 300 psi. The operating mechanism delivers a high starting torque and is adjusted to deliver a greater torque for unseating the valve than for seating it. A handwheel is furnished for manual operation in the event of pressure failure.

Valves equipped with the new fluid-motor operator are available in most types of Crane iron-body gate valves in sizes 4-inch through

30-inch. Development is in progress on a motor for valves of still larger size.

New Vertical Marine Fire Pump

Worthington Pump and Machinery Corporation recently announced a new vertical marine fire pump, known as 3 UBV-13, designed to meet the American Bureau of Shipping's fire pump requirements of 400 GPM at 125 pounds per square inch. Available with electric or steam drive, variable speed permits the use of the same pump for flushing and sanitary services.

The casing is split vertically, with the suction and discharge connec-

KEEP POSTED

The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

PACIFIC MARINE REVIEW

580 Market Street - - - San Francisco

Send me descriptive data of the following new equipment or literature as reviewed in

.... issue. Page No. ....

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(Identify by name of manufacturer and catalog)

NAME ....

BUSINESS ....

ADDRESS ....

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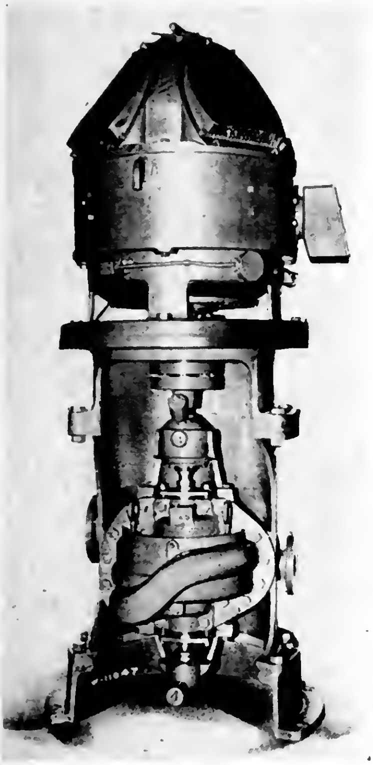
tions located 180° apart in the stationary half, making it unnecessary to break pipe joints or remove the motor when opening up the pump.

The rotating element, complete with the bearing assemblies, is readily removable and interchangeable with the spare rotating element.

Complete specifications and de-



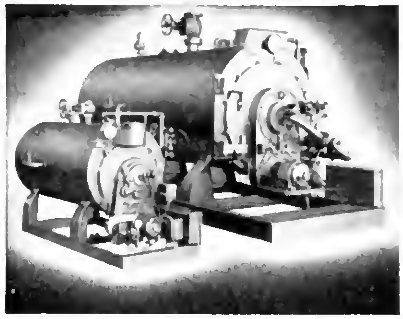
tailed information may be had by writing Marine Division, Worthington Pump and Machinery Corporation, Harrison, New Jersey.

Operating Features Provides Improved Cyclotherm Boiler

New Steam Generators announced by the Cyclotherm Corporation, New York City, emphasize improvements in basic operating features. A new type of high atomizing burner nozzle incorporating a primary air supply assures precise injection of fuel and air for efficient combustion at all firing rates. In addition, the new nozzle design permits interchangeable oil or gas firing without requiring a change of nozzle. The unique nozzle design combined with the Cyclonic Combustion principle maintains high combustion efficiency with either fuel.

Cyclotherm boilers are in use in the U. S. Navy for both land and sea use. They are used aboard ship for a steam supply and heating, not for power.

The new models also include a simplified air supply system, improved combustion and ignition programming controls, and a blower-air channel design that achieves quiet operation. The new line of Cyclotherm Steam Generators is available in sizes ranging from 10 to 300 horsepower, and in pressures from 15 to 200 lbs. Complete de-



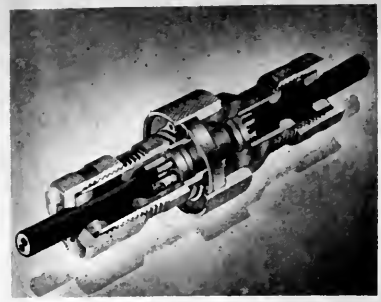
tails are furnished in Bulletin P-1 available from the Cyclotherm Corporation, Dept. 147-R., 90 Broad Street, New York 4, N. Y.

Roylyn 1600

A quick disconnect electrical coupling for all-weather and submarine applications is a new development of Roylyn Inc., Glendale, Cal.

This coupling is known as the 1600 Series and is designed to meet the rigid requirements of the public services and the various industries requiring an electrical connector that is quick acting, heavy duty, impervious to moisture and capable of withstanding long periods of complete immersion under high external pressure without leakage. Many months of submergence tests have been conducted successfully with this coupling on U. S. Navy equipment. Test results show that even with external pressure conditions equivalent to 1150 feet of water, no leakage or moisture seepage occurred.

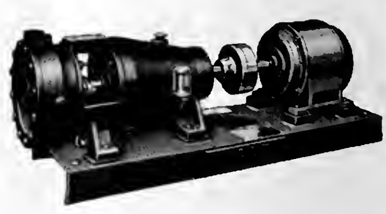
A partial list of applications of the 1600 Series Electrical Coupling includes wide use in the electronic field; geophysical uses, telephone and coaxial cables, submarine cables, marine use, motion picture equipment, searchlights, and oil field use.



Cutaway view of Roylyn 1600 Series Electrical Coupling

Warren Compacunit Pumps, Cradle Mounted

Warren Steam Pump Company, Inc., Warren, Mass., manufacturers of a complete line of centrifugal and reciprocating pumps, announce the addition of Cradle Mounted Compacunits. Unlike the regular close coupled Compacunits, these new lines may be V-Belt, turbine or motor drive. Sizes, 1″, 1½″, 2″, 3″. Capacities, 5 to 450 GPM. Heads, 15 to 500. Materials, standard, all iron, all bronze or special metals to meet unusual requirements.



These Cradle Mounted units have the following features:

Anti-swirl baffle prevents air binding.

Impeller nut locks impeller securely.

Semi-labyrinth case rings maintain efficiency and protect casing.

Smooth flow keyed impeller gives high efficiency and low power.

Renewable, protective shaft sleeve gives triple protection of shaft.

Extra deep stuffing box assures lower maintenance, longer packing life.

Pump supporting frame assures alignment and resists normal pipe strains.

Protective Slinger keeps water

from reaching motor.

Heavy duty angular contact thrust bearing assures trouble-free, long life.

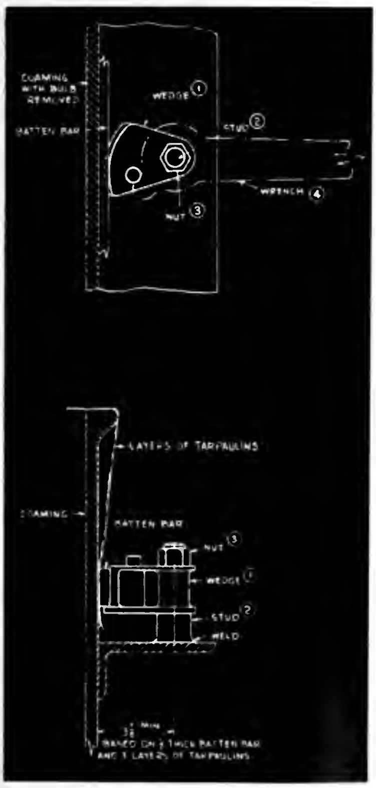
Tested performance insures efficiency and full capacity.

New Batten Bar Wedge Speeds Cargo Handling

A vastly improved method of battening tarpaulins down over cargo hatches has been announced by Engineering Specialties Company, Inc., 39 Cortlandt Street, New York. It is reported that this new method —the Telesco Batten Bar Wedge— is already saving shipowners and operators time and labor on cargo vessels all over the world.

The Telesco Batten Bar Wedge is designed to replace the antiquated system of battening down canvas by wooden wedges driven at intervals around the hatch coaming and requiring costly labor at every opening and closing of the hatch. The new Batten Bar Wedge, welded in position, needs only a turn of a wrench to hold the batten bar securely against the tarpaulins. It is exceptionally sturdy, simple and inexpensive to install, and should render many years of hard service.

Diagram of Telesco Batten Bar Wedge.



Can You Answer Questions Like "Why Carry Lifeboats?"

Many men believe that there is no need for them to wear protective equipment or to change to a safe method of doing a job.

Let's look at a ship. The ship has been carrying lifeboats all her life and perhaps has never had to use them. How about that fire fighting equipment? Has it ever been used to fight an actual fire aboard ship? And the hand steering gear aft and the standby engine room pull bells. Have they been needed? How many men aboard ship now have ever had to use any of this equipment on any vessel during their years at sea?

Why is it that just because a man has never had a chip in his own eye he won't wear goggles, but the fact that a ship had never sunk from under him would not persuade him to go to sea on a vessel that did not carry a full complement of lifeboats?

Allen Jones of G. E. Retires Arthur Bragg Succeeds Him

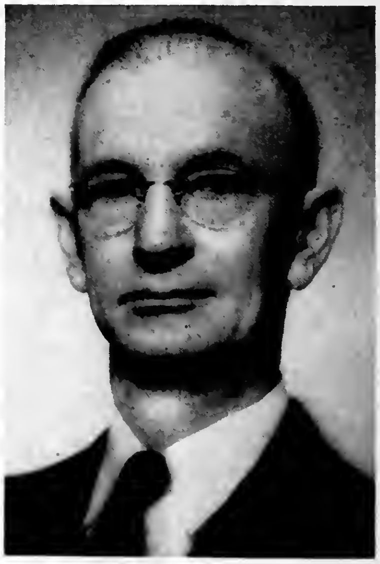
Allen G. Jones, Pacific District Manager of the General Electric Company's Apparatus Department, will retire on October 1 after 44 years of service with the company.

Since 1908, Jones has been with General Electric's San Francisco office, and is widely known in industrial and utility circles throughout the Pacific region. A graduate of Alabama Polytechnic Institute, he joined the company as test engineer in Schenectady, N. Y. After three years there he came to San Francisco as sales engineer. A few years later he began his long and close association with the large power and industrial producers as well as the railroads of the West.

In 1926 he became manager of the company's San Francisco Central Station Division. Some years later he was made Pacific District Manager of both Central Station and Transportation divisions. In 1945 he was named Pacific District Manager of the entire Apparatus Department with headquarters in San Francisco. The territory includes all of California and Arizona, western Nevada, and the Hawaiian Islands.

Jones is a director of the Downtown Association and the Pacific Coast Electrical Association. He is an active member of the traffic committee of the San Francisco Chamber of Commerce, of the American Institute of Electrical Engineers, and of the Electric Club of San Francisco.

Allen G. Jones retires.



Arthur D. Bragg has been named to succeed Jones as Pacific District Manager of the General Electric Company's Apparatus Department. Bragg is well known on the West Coast as both Assistant District Manager of the Apparatus Department and District Manager of the Central Station Division.

After receiving an electrical engineering degree at

Arthur D. Bragg succeeds Jones.

Stanford University in 1925, Bragg joined General Electric's test course in Schenectady, N.Y. Three years later he returned to San Francisco as sales engineer. For several years he was with the company's Fresno branch, and for a short time was assistant to the manager of the Los Angeles office. In 1946 he was appointed Assistant Pacific District Manager of the Apparatus Department.

Chas. E. Lowe Named Marine Pumps Agent

From H. B. "Bert" Hotchkiss, head of Chas. E. Lowe Co., 185 Steuart Street, San Francisco, we learn that his firm is now handling the Northern California district for Marine Pumps, Inc., of Wilmington, California, a division of Diesel Control Corporation, manufacturers of pumps formerly made by Joshua Hendy and Pomona Pumps.

Minnesota Mining and Manufacturing Company's line of 3-M adhesives and deck seam sealers is also handled by the Chas. E. Lowe organization, as well as U. S. Gaskets, pump spun liners, and pump and turbine parts.

The office manager of the company is Ivan K. Wright, formerly with Kaiser yard No. 3 at Richmond. In charge of the Minnesota Mining and Manufacturing Company products is Harry Prout, wartime Army lieutenant colonel who went ashore on Omaha Beach on D-Day five years ago. "Bert" Hotchkiss, who was engineer in well-known Matson ships, was Chief Trial Engineer and Marine Superintendent for Kaiser No. 3 yard during the war.

Annual Meeting of Stress Society

The annual meeting of the Society for Experimental Stress Analysis will be held at Hotel New Yorker, New York City, on November 30 and December 1 and 2, 1949. Inquiries should be addressed to the Society for Experimental Stress Analysis, P. O. Box 168, Cambridge 39, Mass.

Panama Canal

(Continued from page 35)

only those costs attributable to the transits of commercial vessels;

That Congress recognize the national defense value of the Canal; and

That a fair and equitable formula be established for setting toll rates, based on these considerations.

15 WHAT SHOULD BE DONE TO ACCOMPLISH THIS?

1—The cost of toll-free Government transits should be eliminated as a factor in determining tolls on commercial ships.

2—Completely unrelated Government functions should be eliminated as factors in determining tolls on commercial ships. Some division of costs should be made on partially related or "dual-purpose" items.

3—As a minimum recognition of the national defense value of the Canal, the so-called "interest" charges should be eliminated.

16 WHY ARE PANAMA CANAL TOLLS OF PARTICULAR INTEREST TO THE PACIFIC COAST?

Because, proportionately, Pacific Coast cargoes are hit heaviest by the tolls.

Ton for ton, West Coast ports pay tolls on more cargoes than the Gulf or Atlantic Coast.

17 WHAT HAS BEEN DONE ABOUT THE PROBLEM TO DATE?

Certain recommendations, in the form of a report, were made on August 23 to the House Merchant Marine and Fisheries Committee by a special Panama Canal sub-committee of the Merchant Marine and Fisheries Committee. The report was approved by the Merchant Marine and Fisheries Committee which transmitted to the President two requests contained in the report as follows: 1. That a study be made of the organizational aspects of the Canal, including the Panama Railroad, and recommend to Congress suitable changes in existing laws. The Committee said "it is believed that this study may be concluded within the present calendar year, and in any event, not later than January 31, 1950. 2. To hold in abeyance the effective date of Proclamation 2775 of March 26, raising tolls to $1.00, until a decision is reached as to the final organization of the Panama Canal.

On August 25 the President issued a proclamation postponing until April 1, 1950, the effective date of Proclamation 2775, and directed Frank Pace, Jr., Director of the Bureau of the Budget, to make a study of the organization of the Panama Canal. The Bureau of the Budget has indicated that other federal agencies may assist in the work.

Story of Air Conditioning Pioneer Told

The life and work and contributions of Dr. Willis H. Carrier, "Father of Air Conditioning", are touched on in a booklet put out by the Newcomen Society of England who recently honored Dr. Carrier for his work in air conditioning. Dr. Carrier is Chairman Emeritus of the Carrier Corporation.

In 1902 the idea of air conditioning was born; creator of that idea was Dr. Carrier. The tremendous development of that industry and Dr. Carrier's part in it are aptly told through the pages of this booklet.

Plymouth Cordage Company

(Continued from page 85)

headed the company from 1870 to 1882; ill health forced his retirement. Gideon F. Holmes took over then, serving the Company until 1911, when his son, Francis C. Holmes, took the reins. He served until 1938 and then Ellis W. Brewster became president.

Plymouth manufactures rope of both natural and synthetic fibers and in some 60-odd constructions to meet specific uses. Its twines are used for commercial tying and wrapping, for binding small grain crops, for baling hay. There are other miscellaneous but important uses such as yarns for carpets, centers for wire rope, roping used in the manufacture of Sisalkraft papers. Plymouth constantly seeks new markets, new ways to use hard fibres but its famous Ship Brand Manila Rope sets a world standard for quality.

The Company's entry into the binder twine market in 1892, its leadership in developing the baler twine market with the machinery people in 1939, its study of synthetic fibre and the introduction of nylon rope—all are typical examples of this forward-looking merchandising policy.

A recent issue of ROPE WALK, a Plymouth Cordage Company publication, gives a more complete picture of the company's steady growth. The issue has many attractive illustrations relating to the Company's history and to its present operations, a few of which are on these pages.

Navigation History of Pacific Railroads

(Continued from page 83)

Summit to Glenbrook. Here, under the shadow of Shakespeare Rock, workers from the Union Iron Works reassembled the little hull, 160 feet long and admeasuring 154 gross tons, and the ship was christened by the two year old grandson of the line's builder, Duane L. Bliss, as she slid into the blue Tahoe waters, June 24,. 1896.

For forty-five years the little steamer, with her two three-cylinder compound engines, throbbed her life heartbeats on the mountain lake, until, at Glenbrook, in 1941, the vessel was purposely sunk within a half mile of her birthplace.

Eugene V. Winter Co. Announcement

Eugene W. Winter, maritime engineer and owner of Eugene V. Winter Co., and son of the founder of the firm, passed away last month at Boyes Springs, California. The business will be carried on by Felix V. Billig, who has been with the organization for the past eleven years, and who is widely known as Secretary-Treasurer of The Mariners' Club of California. M. A. Kindy remains wtih the company. The Eugene V. Winter Co. was founded 35 years ago and represents the following firms in Northern California:

American Hammered Piston Ring Division of Koppers Co., Inc.; National Transit Pump & Machine Co.; Maxim Silencer Company; Sims Pump Valve Company; and Red Hand Compositions Co. Offices of the Winter firm are at 15 Drumm Street, San Francisco.

Functional Pilot House

(Continued from page 31)

which can find place under the heading: "Emergency Central." They are located there because many of these instruments give their alarm with flashing lights—a light flashing from that location cannot be missed by the conning officer at position "X", since the reflection of that light would show on the forward window. By the same token: it cannot be ignored. Also, this is one spot where a bulkhead does not interfere with visibility from the conning position.

In Plate II the Semi-circle of Sensory and Control instruments is shown in some detail. The instruments shown are those in use on the writer's former command. The instruments are located within a radius of five feet of a point two feet six inches aft of the conning position, as shown. This places all instruments within easy scanning or controlling distance of the conning officer. In any event, they should be so spaced along the semi-circle that each instrument has enough room about it for the purpose of easy adustment or of opening for repair or servicing.

Just aft of the semi-circle is a solid light-baffle of light plate, sheet metal, wood of fire-proof boarding. This baffle extends up as high as the highest point of any instrument and is capped with a rail for the purpose of leaning elbows. The instruments themselves are all tilted inward toward the radius center of the semi-circle. Between the tilting in of the instruments and the light baffle inside of them all light leakage can be kept from reflecting on any windows in the pilot house. (It is suggested here that if an objection is raised to the general idea of pilot house chart-desks and instruments because of their lights, a sudden shaft of light into the pilot house caused by an opened chartroom door is more detrimental to vision.)

The instruments in this sketch are positioned for definite reasons. Assuming most navigators to be right-handed, then instruments that are going to be manipulated should be on his right . . . the whistle pull, electric whistle, engine room telegraph. Otherwise, the instruments are positioned for reasons of orientation of the navigating mind of the navigator. The Radio Direction Finder should face forward so that any direction obtained from it is directly transposable to the beyond through the pilot house windows. The fathometer recorder, the new type which shows an undistorted side elevation view of the bottom, is placed in the position shown so that the view of the bottom shoaling or increasing in depth can be easily imagined by and transposed by the navigator. The instrument second in importance to all those shown —the fathometer indicator—is close to the forward-looking position of the navigator, as is in the course recorder which tells him if the ship is heading the direction he wants it to be heading. The radar scope is farthest forward and dead center in the most strategic position. The engine RPM and direction indicator is so placed that if the indicating needle points forward it is because the engines are going ahead or, if pointing aft, because the engines are going astern—not pointing to starboard or port as is the case when this instrument is usually secured to the forward bulkhead of the pilot house.

In Plate III an interior profile of the pilot house is shown. The boiler gas uptake is trunked within the after apex of the streamline form of the pilot house structure. The foremast is erected immediately over the Radar room to provide straight up lead for the wave guide trunk. On this mast are located Radar antenna, masthead light, whistle and signal yardarm (one blessing here is that the radio-direction-finder antenna, projecting through the

forward deckhead of the pilothouse, is not obstructed by mast structure and stays and will, therefore, allow an easier and more accurate calibration of the radio-direction finder).

Not shown in Plate I are the bridge wings, since they are not a part of the theory advanced in the article. Only one design requirement must be met by the bridge wings to preserve the functional aspect of the pilot house described—they must sweep down toward the extreme wing along a cambered deck so as not to obstruct the centralized visibility from point "X". They need not sweep back and they may run along an athwartship line even with the forward tip of the pilot house. Whistle, engine telegraph, etc., controls would appear out on the wings as necessary for docking operations.

The "streamline" shape of the pilot house was chosen not because it is eye-pleasing or because it would reduce wind resistance but, instead, because this particular shape lent itself best to the purpose of affording the maximum visibility from forward conning position "X". Actually, a perfectly circular pilot house would provide the greatest visibility but would also require too large a radius to encompass the operating space required inside it.

Pacific Far East's Expansion

Pacific Far East Line has inaugurated a monthly Pacific Coast-Mediterranean service via the Canal between the major ports on the Pacific Coast and the ports of Genoa, Trieste, Piraeus and Beirut, with the first sailing scheduled for September 27.

The new service will be the second American flag service from the Pacific Coast to the Mediterranean.

All four vessels in the service will be privately owned and will be C-3 type, with accommodations for twelve passengers.

Pacific Far East Line was established after the war with headquarters in San Francisco. It is now one of the largest trans-Pacific cargo carriers operating to the major ports of the Orient, Red Sea and Persian Gulf. Majority of its executives are West Coast men whose entire careers have been spent in trans-Pacific shipping. Its present expansion has created deep interest in trade and civic circles.

Charting of Aeronautical Radio Beacons

Aeronautical radio beacons located near seacoasts, although primarily intended for air navigation, have been found to be extremely useful to the mariner, especially in cases where marine beacons are nonexistent.

It has therefore been decided to show selected aeronautical radiobeacons on the nautical charts in areas where marine radiobeacons are insufficient for marine use.

The beacons will be shown primarily on small-scale charts as aids to offshore navigation and indicated by standard symbols. Both homing beacons and radio ranges will be charted, but in localities where several installations exist, only the most useful one will be shown.

The Hydrographic Office would appreciate receiving accounts from shipmasters who have utilized these air navigation aids in areas where marine aids are deficient. This will assist the office in selecting the beacons to be shown on the charts. All letters should be addressed to the Hydrographer, Navy Hydrographic Office, Washington 25, D. C.

Slide Rule For Deck Officers

(Continued from page 49)

that with a slide rule."

Farran laughed. "But I saw you using a slide rule last week, forward in the carpenter shop."

"And you did not!—Mr. Farran, have the pixies been getting you too, lately, since we were South of the equator?" Mac was more surprised than hurt by the statement. He had never yet caught Frank Farran off base in any situation and thought surely he had one on him now.

"But, Mac, I am sure I saw you using two six foot zig-zag carpenters' rules. You laid one down alongside of the other, carefully adjusting the end of one to some inch figures on the other and then, without moving them, read an inch measurement on the second at some inch measurement on the first. Now didn't you?"

"Oh, of course. You see, Frank, my addition of figures in my head or even on paper is none too good, and inch fractions, them I just can't add. So I just lay out the two inch measurements, fractions and all, on two rules to add up and just read the answer. It's an old trick my father taught me in the old country. Here, I'll show you."

Mac excitedly took a white and a yellow six-foot rule out of his desk "Look," he said. "Suppose I want to add 16¼ inches to 48½. I put the end of the yellow rule at 16¼ mark on the white one. Then I find the 48½ mark on the yellow rule. And sure enough right there but on the white rule is the sum of the two figures. See, 64¾; and I know that's right because if I cut two sticks to these two measurements and placed them end to end the total length would be the same as these two figures. . . . So, by the light of the Southern Cross, I've got an adding machine and didn't know it. But it's no good for decimals."

Frank smiled. "That's right, and that is a slide rule for adding. You slide one rule along the other, set them together, and read an answer. So you were using a slide rule and tried to deny it. What's more, it would be good for decimals if inches were divided up into tenths and hundredths instead of quarters and eighths and sixteenths. You can get rules divided in decimals . . . either the 'Engineers' scale (Civil Engineers, not Marine) or the metric scale used nearly everywhere in the world."

Both Mac and George were staring at Frank in amazement as the new light struck them in understanding. Mac said, "Well I'll be a monkey's uncle." George was silent.

Frank continued, "Now look. Here on Mac's desk is an advertising novelty scale with one side marked in centi-

meters and one side in inches. I have in my pocket one just like it. Suppose we want to add 4.5 to 3.5. We slide the rules alongside of each other like so. (Fig. 5). The end of the bottom one lines up with the 4.5 reading of the upper one. Over the 3.5 of the lower one we read the answer on the upper one. It is 8.0 just as simple as that. If you can read 3 significant figures in the scale you can add them in this way. You could easily read, for instance, 2.36 centimeters and also 5.82 and could add them to get 8.18, reading the answer right off the scale without any mental adding. This operation would also be good for .582 and .236 or .0582 and .0236 or any combination of them. But you would not locate the .532 down below the 1 on the scale as the calibrations are too small. You would locate the .532 between the 5 and 6 centimeters on the scale and the .236 between the 2 and 3 on the scale, thus disregarding the decimal point momentarily, or rather multiplying all numbers by 10 and dividing the answer by 10. This puts the readings up the scale where they can be read more accurately." (Fig. 6).

The look of amazement in Mac's eyes changed as a new thought struck his mind. "Ay, that I can understand well enough but let us see you try to multiply on them things. This I must see with my own eyes because me old man must have missed something. He was none too smart at that."

A knock on the door drew their attention. A voice in the passageway shouted, "Mr. McCoy, hurry up. The evaporators are foaming up something terrible and the No. 2 fresh water tank is all salted up already."

Mac reached for his cap, flashlight, and crescent wrench and rushed for the door.

Farran looked at George, winked and said, "We will have to postpone the answer to that one for another time.

Reports of Institute of Aeronautical Sciences

The following reports, dealing with planing surfaces, cover work carried out under the auspices of the Office of Naval Research, U. S. Navy Department. They have been published by the Sherman-Fairchild Publication Fund of the Institute of the Aeronautical Sciences and can be purchased from the Institute of the Aeronautical Sciences at 2 East 64th Street, New York 21, New York.

Preprint No.	*Title and Author*	*Price*
166	"An Analysis of the Fluid Flow in the Spray Root and Wake Regions of Flat Planing Surfaces," John D. Pierson and Samuel Leshnover.	$1.60
167	"On the Pressure Distribution for a Wedge Penetrating a Fluid Surface," John D. Pierson.	$1.00
168	"Wave Contours in the Wake of a 20° Deadrise Planing Surface," B. V. Korvin-Kroukovsky, Daniel Savitsky, and William Lehman.	$1.60
169	"The Discontinuous Fluid Flow Past an Immersed Wedge," by B. V. Korvin-Kroukovsky and Faye R. Chabrow.	$1.00
170	"Wave Contours in the Wake of a 10° Deadrise Planing Surface," by B. V. Korvin-Kroukovsky and William Lehman.	$1.60

Acid Tanks

(Continued on page 50)

points where contact with other barges or lock walls is most frequently made.

The tanks, 12 ft. in diameter and 73 ft. long, are strapped in steel saddles anchored to the floor of the hold. Seven saddles are provided for each tank. Fabricated by Blaw Knox Company, Pittsburgh, the tanks were transported by rail to Akron, Ohio, for installation of the rubber lining by B. F. Goodrich Company. Two flat cars were needed to carry each tank. Because of bridge and tunnel clearances the domes were removed during the rail shipment and fitted on the tanks at Dravo's shipyard. All acid piping on the barge also is rubber lined.

Construction of the barges and the tanks was in conformance with the rules of the American Bureau of Shipping and the U. S. Coast Guard.

The barges are painted bright vermillion with blue-green trim and lettering.

Simple Weather Guide

A simple weather guide that forecasts accurate weather information 12 to 24 hours in advance in a fraction of a minute is the latest aid to shipping lines, yachtsmen and small boat owners.

The new device figures out local weather from wind and cloud conditions based on the most recent war-born forecasting techniques and data gained from 50 years of daily weather charts for the entire Northern Hemisphere. It fits conveniently in a pocket, according to American Optical Company.

The instrument is simple to operate. After noting wind direction, clouds in the sky are matched with one of seven pictures of cloud formations on the face of the instrument. Then a turn of the dial aligns a red arrow with the wind direction and the correct weather prediction for the next 12 to 24 hours appears in a little window.

Chief benefit of the weather guide to yachtsmen and other boat owners, is ability to plan trips confidently by forecasting weather for the next 24-hour period.

The instrument was developed by Dr. Irving P. Krick, president of the

The weather guide described in the release.

American Institute of Aerological Research, and for 15 years active head of the Meteorology Dept. of the California Institute of Technology.

What Is It?

Workers earn it,
Spendthrifts burn it,
Bankers lend it,
Women spend it,
Forgers fake it,
Taxes take it,
Dying leave it,
Heirs receive it,
Thrifty save it,
Misers crave it,
Robbers seize it,
Rich increase it,
Gamblers lose it . . .
I could use it.

Tuna Clipper

(Continued from page 43)

war when there were less than 100 Tuna Clippers. This rapid increase means that the present fishing grounds are pretty well crowded. The fishermen, well aware of this, are looking anxiously to the Central and Southwestern Pacific waters for possible expansion of the tuna fishery. The government is outfitting and sending research vessels to further explore these areas.

From all the information now available, the tuna fish are there and in great numbers, and in some areas there is bait, but the question is, can they be caught by a Tuna Clipper of the present design and facilities? Dr. W. M. Chapman, formerly head of the School of Fisheries at the University of Washington, and now Special Assistant to the Under Secretary of State in Washington, D.C., in charge of fishery matters says, in a letter to me, that "before the war the Japanese were taking approximately as many skipjacks in the area of our present Trust Territories as our large tuna fisheries were taking in the Latin American Area."

And that they "had discovered the rather large quantities of Yellowfin Tuna that were available south of the Caroline Islands." M. B. Schaefer, Chief of the Section of Biology and Oceanography of the Fish and Wildlife Service who can compare from personal observations the quantities of tuna in Central American waters and in many parts of the Central and South Pacific, attests to the great quantities of tuna to be found there, but adds, "the problem of catching these fish, may offer some difficulties to the Tuna Clipper because of the weather encountered in some parts of the region at least, the behavior of the fish, and the bait problem." He adds, "The unfortunate fact is that there is just not enough detailed information available to reach any very firm conclusions."

Dr. Chapman says, "I would not be willing to invest my money in tuna fishing operations down there on this slight amount of evidence, which was scattered over such a large area of ocean."

The last word on the subject has not been said. However, in my opinion, Dr. Chapman voices the attitude of the West Coast Tuna Men in his statement, "Where there is a market as there is for tuna, and where there is a source of raw material, American fishermen will be sufficiently ingenious to work out a method of getting the raw materials out of the sea and to their markets."

The long range Tuna Clipper, highly specialized though it is for fishing the Central American Tunas, may yet be the means of bringing this new-found tuna wealth to the American market.

Note: This paper by James Petrich has features not usually found in such presentations. Future issues of Pacific Marine Review will include at least parts of his sections on "The Beginning of a Tuna Clipper", "The Architect and the Tuna Clipper", "The Fisherman and the Tuna Clipper", "The Shipbuilder and the Tuna Clipper", and "The Completion of the Tuna Clipper".

This paper was presented before the Northern California Section of the Society of Naval Architects and Marine Engineers, March 31, 1949.

Shell Turbo Oil 37

Shell Oil Company's chemists have produced what they believe to be a turbine oil of "perpetual duration". Or at least of so durable a quality as to emerge from some 253,000 ocean-going miles, logged over a three year span, in what was pronounced perfect condition.

It is Shell's Turbo Oil 37, a rust-inhibited turbine oil, for 36 months a tireless laborer in the two cross compound steam turbines powering the American President Lines recently owned S. S. *General Meigs.*

Engineers of the steamship company's trans-pacific liner gave out the verdict on the eve of the *Meigs'* termination of service. However, the honor done to Turbo Oil 37 was nothing new to this pioneer corrosion-resistant.

Shell had been working on the problem of rust in the lubrication systems of the main propulsion turbines of certain combat vessels, particularly on a number of destroyers engaged in North Atlantic convoy duty, and its Turbo Oil 37, successfully passing the armed forces' rigid requirements, supplied the knockout punch on the deadly corrosive enemy. Its deadly record in the *Meigs* seems to confirm the record made during the war.

Tanker "Trinity's" Sharp End

John Ireland is skipper, Broderick Crawford chief engineer and Ellen Drew, the girl in their lives in the vessel in "Cargo and Capetown," Columbia picture. The ship is the Hillcone Steamship tanker "Trinity."

Specializing in bulk transportation of liquid products, as "California Street" well knows, is the main function of Hillcone Steamship Company. We called in on Operating Manager Chet Ames the other day to ask what's new and Chet explained as per usual nothing startling.

As we're heading out of his office he mentioned that the tanker *Trinity* was recently chartered to Columbia Pictures for the making of movie scenes in a sea story around a tanker and said camera clicking occurred off Catalina over several days.

As mentioned, Chet A. explained it was all just usual . . except as the action unfolded the *Trinity's* deck resounded with such language as "rumpus room" for saloon; "Go up to the sharp end of the boat"; "Take this down to the blunt end of the ship" (for stern) . . . not to mention "going upstairs" "basement" and/or "downstairs" . . . and Oh, Yes,—the bulkheads were "walls"; the deck was "the floor" . . . and it was all amusin' and confusin' to *Trinity's* crew of old timers.

Watch for the picture "Cargo for Capetown" starring Ellen Drew, Broderick Crawford, John Ireland and Buck Buchanan . . . a 90-minute Grade "A" feature.

—from PF's rambles

Tribute to Frank Lawler of S. & C.

As a friendly gesture toward a veteran associate, a group of friends of Frank C. Lawler of Sudden & Christenson last month gathered around the luncheon table at San Francisco and a good time was had by all. Reason for the affair was Frank's impending 50th Wedding Anniversary. In attendance were: Arthur B. Cahill, Louis C. Stewart, Charles E. Christenson, Fred J. Foster, Clare L. Thomas, George P. Bradford, Robert S. Norton and Captain R. O. Demarest.

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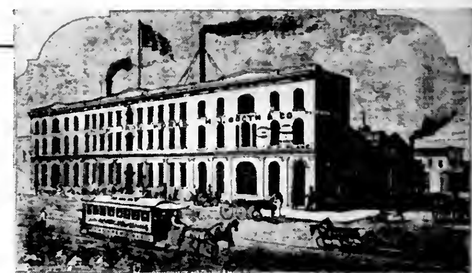
BETHLEHEM'S

San Francisco Yard

1849-1949

a century of progress

Mechanics' monument in San Francisco, dedicated to memory of Peter Donahue, founder of Union Iron Works, forerunner of San Francisco Yard.



Union Iron Works as it appeared in 1867.

The California, first standard-gage locomotive built on Pacific Coast, at Union Iron Works, 1865.

Gold dredge built in 1897 at Risdon plant, later part of San Francisco Yard.

Cruiser Olympia, Admiral Dewey's flagship at Manila Bay, built at Union Iron Works.

Founded as a two-man smithy 100 years ago, Bethlehem's San Francisco Yard today is one of the largest and most modern shipbuilding and ship-repair plants in the world, and is in addition the oldest continuously-operated private yard on the Pacific Coast.

We have just published a handsome, colorfully-illustrated booklet recording the history of this yard's development and growth, and setting forth its record of accomplishment. A copy will gladly be mailed on request.

BETHLEHEM STEEL COMPANY

Shipbuilding Division

Pacific Coast General Offices

20TH & ILLINOIS STS., SAN FRANCISCO 19

Telephone—Market 1-3200

BETHLEHEM STEEL

Pacific Marine Review

Port Problems are in Port Hands

FOR A GREAT INDUSTRY like the Merchant Marine, the problems that constantly arise within the industry should be simple of solution. They do not seem to be, for one group after another paws the air in an effort to correct or offset the discriminations under which it suffers, while the industry *as a whole* does little.

For instance, it is common to hear complaints that cargo is being diverted from one coast to another because of excessive port charges of around 90c per ton. Some urge that the steamship companies absorb them. It happens that the cost to the operator for transiting the Panama Canal is also 90c per ton, but you do not hear the shippers who will pay it complain of it or demand its repeal as they demand action on such a matter as the reciprocal trade treaties. No, shippers are not interested in such far-away problems when they can't see the canal toll on their freight bills. Nor are the shipbuilders interested, nor the ship supply dealers, nor admiralty lawyers, although it is diverting business from them.

Another case: Too often rate differentials are quoted in cents alone. Seldom is sufficient weight given to the factor of *time*. Time has a *dollar* value in shipping, for shipping from the nearest port would save an average of two weeks' investment, plus two weeks' insurance. Are not terminal operators, importers and exporters interested in this? They should be.

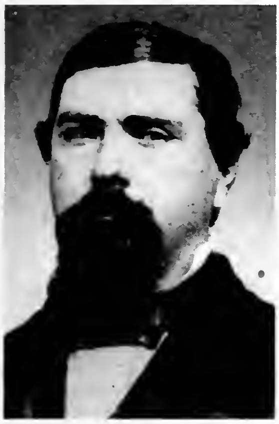
Again: If rail rates to port cities are depressed to the point of extinction for intercoastal and coastwise services, should not the City Government be concerned? And the Chamber of Commerce? And the banks? And the unions? They could stop this trend, but they seem by their *actions or inaction* to support it.

Or take the demands or inefficiency on the part of Maritime labor, or Maritime management. These are the concern of everyone in the industry and those who will ultimately pay the bill should be informed of the extent of their interest and be heard before commitments are made.

Aloofness from the waterfront may be a happy state of mind for some, but it is a sort of Nirvana which port cities cannot afford. All of those mentioned above should get in the act together. One or another may be satisfied with today's business but need help tomorrow. This diverse industry, acting together can get results in almost any direction. It does not act together and hence is batted around like a shuttlecock by everyone from Washington down. It is time it stopped.

Airplane view of the Bethlehem Yard showing its location in San Francisco harbor.

History of Bethlehem's San Francisco Yard 1849-1949



PETER DONAHUE,
Co-founder, with his brother James in 1849, of the smithy which eventually became the Union Iron Works.

AS OLD AS THE CITY and older than the State is the San Francisco shipyard of Bethlehem, one hundred years old this month.

Among the early arrivals in San Francisco during the gold rush year of 1849 were Peter and James Donahue, one a machinist and the other a boilermaker, who like all other '49ers had come in the quest for gold.

They must, however, have soon abandoned their search for gold in order to work with iron, because authenticated records show that they met in San Francisco and invested their joint capital of $500 in a blacksmith and machine shop, which they housed in an adobe hut on the northwest corner of Jackson and Montgomery Streets. Their original equipment consisted of only a pair of hand-operated bellows and a charcoal forge.

So great was the need for iron products that the two Donahue brothers soon had to seek larger quarters, and in the Spring of 1850 they moved to the northeast corner of First and Mission Streets, the waterfront of what was then known as the Happy Valley Region, and the industrial section of early San Francisco. The San Francisco Herald described their new plant as "a small building, containing a blacksmith's forge, a small lathe driven by hand power, and a little cupola, in which the iron for making castings was melted, with the aid of a common smith's bellows." The Donahue brothers called their shop the Union Iron and Brass Foundry.

James and Peter were soon joined by a third brother, Michael, a molder, and the brothers thus combined the three leading trades needed in their young, growing enterprise. Of the three, Peter proved to be the one who really guided the business through the years that followed.

They had to make additions to their plant from time to time, until

One of the Union Iron Works first advertisements — appearing in Parkers' Directory, 1852 and 1853.

Union Iron Works, forerunner of the San Francisco Yard, as it appeared in 1867 at First and Mission Streets. The Bay came up to First Street in those days.

in 1856 it consisted of three brick buildings—a foundry, a finishing shop and a boiler shop.

Early Ship Work

The first iron casting produced in California was made by the Union Iron and Brass Foundry in 1850. This was a spring bearing for the shaft of the steamer *John S. McKim*, the first propeller-driven commercial vessel built in the United States. Records disclose that the cost of this casting was 50 cents a pound.

Machinery for the Saginaw

In 1853 James and Michael sold

GEORGE W. DICKIE,[1]
Manager of the Union Iron Works, 1883 to 1903.

their interest to Peter, leaving him sole owners of more than $150,000 worth of equipment. Peter built a large brick building on the site of the first crude workshop. He also changed the name of the business to "Union Iron Works, Peter Donahue, Proprietor" but this he soon afterwards shortened to Union Iron Works.

It was at the Union Iron Works that the machinery was made for the *Saginaw,* the first Naval vessel built on the Pacific Coast. The *Saginaw* was a side-wheel steam-driven coastal-service gunboat of 453 tons, with an average speed of "over 8 knots." The propulsion machinery for this vessel was completed in 1859. In order to patronize the local logging industry the builders had been prevailed upon to use laurelwood for the hull, but due to the action of the sea water the hull rotted away within two years and had to be rebuilt. However, the $80,000 worth of machinery supplied by the Union Iron Works stood up well and was installed in the new hull.

From 1856 to 1863 the Union Iron Works advertised a wide variety of products such as machinery and castings of every description, "steam engines built and repaired," saw mills, threshing machines, grist mills, gearing, malt rollers and all kinds of mill work. They also advertised building castings, iron fronts and columns for stores, railings for balconies and stairs, door and window sills, staircases, etc.

The Union Iron Works also had a hand in building the second war vessel constructed on the Pacific Coast, the monitor *Comanche.* Parts for this vessel, which were manufactured by Secor & Co., of Jersey City, N. J., and shipped around Cape Horn in the *Aquila* to San Francisco, were assembled by craftsmen of the Union Iron Works. Donahue, Ryan & Co. were the building contractors.

So great was Peter Donahue's zest for new enterprise, however.—he helped establish the San Francisco Gas Works, the Omnibus Street Railway and the San Francisco and San Jose Railway—that he was unable to devote his full time to his own business. In 1863 he sold a two-thirds interest in the Union Iron Works to Henry J. Booth and Charles S. Higgins, and this copartnership was called Donahue-Booth and Company. Irving M. Scott, who had come to the Union Iron Works in 1860 as a draftsman and had risen to a position of responsibility and authority in the firm, was induced to return as superintendent. For fifteen months prior to that he had worked as superintendent of the Drafting Department at the Miners' Foundry which was turning out mining machinery for the Comstock Lode, which Scott expected to be the largest scource of revenue for many years to come.

Under Scott's leadership, the Union Iron Works turned to the construction of mining machinery, and after the Comstock Bonanza was over, it was estimated that the company had built well over 90

JAMES DICKIE,[2]
Superintendent of the Union Iron Works, 1883 to 1903. Brother of George W. Dickie.

per cent of all the machinery that had been used in the Nevada mines.

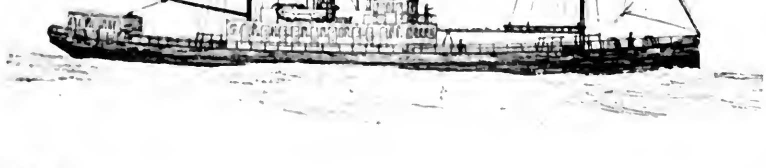
During this period Peter Donahue undertook the construction of a 50-mile railroad from San Francisco to San Jose, as well as the building of locomotives for the same railroad.

In 1865, Peter Donahue and Charles Higgins sold their interest in the firm and Henry J. Booth, George W. Prescott and Irving M. Scott went into partnership, the latter becoming general manager of the works. The new firm was known as H. J. Booth and Company.

For the next ten years the company grew and prospered. New machinery was purchased, more men were employed, and it came to be known as the most completely equipped foundry and machine shop

[1]George Dickie was the father of the late Alexander J. Dickie, longtime Editor of PACIFIC MARINE REVIEW.
[2]James Dickie was the father of David W. Dickie, Naval Architect, of San Francisco.

The S.S. "Arago," first ship built by the Union Iron Works and the first steel vessel constructed on the West Coast. A 200-foot collier of 750 tons register. Delivered on May 28, 1885.



on the Coast. As many as 500 men were employed, in eight different crafts. Yearly consumption of pig iron by the company is estimated to have been 4.500 tons. An Apprenticeship program was established which allowed for the employment of boys 17 years old under a four-year training program with graduated wage increases every year.

In June, 1875, Booth retired from the business and the firm name was changed again, to Prescott, Scott and Company. During this period the company manufactured many of the large hoisting and pumping plants for the Comstock Lode and the Alaska Treadwell Mines. Pumping machinery capable of pumping 106,000 gallons of water

J. J. TYNAN,
General Manager, 1905 to 1927, died 1932.

per hour from a depth of 400 feet was built for the Union Consolidated Mine. This machinery was said to have cost over a half-million dollars. Machinery was also built for gas works, power stations, water turbines, cable railroads, beet sugar plants, roasting and smelting of ores, etc.

Steel Ships

Throughout his business career Irving M. Scott was known as a man of keen business acumen, great vision and foresight. It was his idea, revolutionary in those days, to build steel ships on the Pacific Coast. This idea came to Scott during a transpacific voyage early in 1880. Instead of coming directly back to San Francisco he continued around the world, visiting many shipyards in the course of his journey. On his return he reorganized Prescott, Scott and Company for the next important phase of its operations: shipbuilding.

Years later, when asked how he happened to make ship-building his company's principal business, Scott said: "The decline in the demand for mining machinery and the business of mining had proceeded . . . the railroad development seemed to have been carried to a disastrous point of competition . . . the agricultural machinery manufactured in immense quantities throughout the West seemed to show that the branch was covered . . . transportation on the waters had been neglected. It seemed that the unoccupied field of ocean transportation must eventually come up and keep pace with the giant growth of railroads. This is what led my attention to the enterprise of shipbuilding."

Despite Eastern skepticism and the great distance from Eastern markets and facilities, Prescott, Scott and Company proceeded with their new venture. The business was incorporated, reverting to the early name of Union Iron Works, and 32 acres of land were purchased in the Potrero District — where Bethlehem's San Francisco Yard is situated today — about 2½ miles from the original location at First and Mission Streets. In 1883 new buildings were constructed.

President of the new corporation was George W. Prescott. Henry T. Scott, brother of Irving M., was vice president and treasurer, and

A. S. GUNN,
became General Manager in 1927, died 1944.

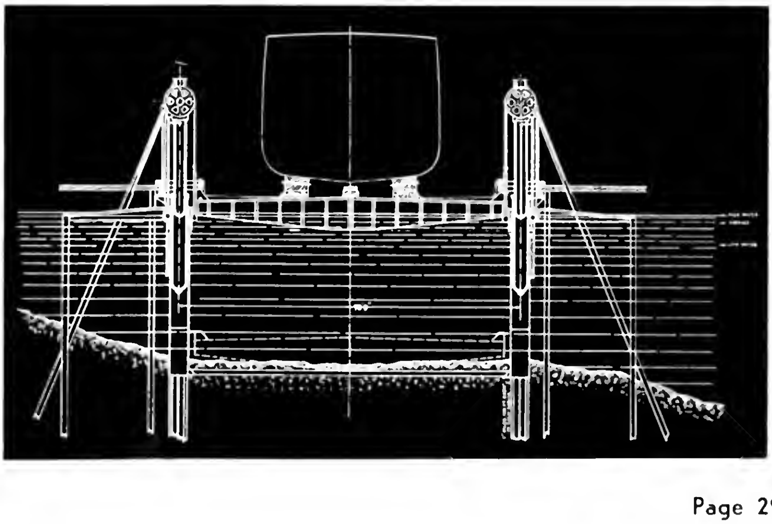
Irving M. Scott was general manager. George W. Dickie and his brother James Dickie were brought in to take charge of shipbuilding under the titles of superintendent and manager.

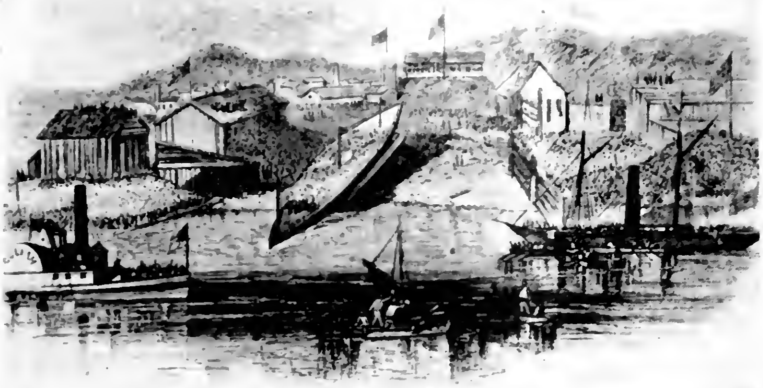
Everything for a Ship

The Union Iron Works was probably the most complete plant of its kind anywhere. With few exceptions, everything that went into a ship was made in the plant's own shops, primarily because of the distance from Eastern sources. Much of the yard's machinery and facilities were designed and produced by local craftsmen, including a hydraulic-lift drydock and a 500-ton hydraulic flange press, which is in operation to this day.

First ship off the ways of the new Union Iron Works was the *Arago,* a 200-foot collier, completed in

Cross section of hydraulic-lift drydock, built by Union Iron Works for use in the shipyard, about 1885.





Top: Launching of the Monitor "Camanche," first ironclad vessel built on the Pacific Coast, in 1864.

Center: Waterfront of the Union Iron Works in 1885.

Bottom: Vessels in sufficient number to make a task force undergoing repairs in the San Francisco Yard, June, 1945.

1885. Following is a description of the *Arago* taken from the San Francisco Commercial News of April 3, 1885, and reprinted in the August, 1931, issue of PACIFIC MARINE REVIEW:

"This company—the Union Iron Works—obtained a contract for building the first steel vessel ever constructed on the West Coast and in fact the first large vessel ever built here of metal. The steamer was contracted for by the Newport, Coos Bay, Oregon, Coal Company and work was commenced on her and is now nearly finished. The *Arago*, for that is her name, is a steel screw steamship of about 750 tons register, 200 feet long on the water line and 207 feet over all, 30 feet beam, and 16 feet depth of hold. She is built entirely of steel; and the keel, stern, and stem frames were forged at the Union Iron Works, while the plates were rolled in the East and brought here. The ship has four water-tight bulkheads and a water ballast tank under her engine and boilers, making six water-tight compartments, each of which can be pumped out independently of the others.

"The *Arago* is especially designed for the coal trade, having large hatches which facilitate loading and discharging and she is practically self-trimming, no labor being required after the coal comes on board from the chutes at the bunkers where the coal is stored, the intention being to haul under the chutes, receive on board 1,000 tons of coal, and sail on the same tide."

Ships that Made Naval History

During the years that preceded the Spanish-American War, and up until 1902 when it was sold to the United States Shipbuilding Company, the yard built 75 vessels, including several which have gone down in Naval history. Among these was the Cruiser *Olympia,* flagship of Commodore Dewey when he steamed into Manila Bay on May 1, 1898, and destroyed the Spanish Fleet. Also built at Union Iron Works was the most-storied vessel in the new Navy of those days, the Battleship *Oregon,* famed for her race around South America to be in on the action that occurred when Admiral Cervera's four fast, heavily-armored cruisers of the Spanish fleet made a running fight to escape from the harbor of Santiago de Cuba on July 3, 1898. This epochal race helped convince authorities of the need for the Panama Canal.

Among other famous Naval vessels built by the Union Iron Works during this period were the cruisers *Charleston* and *San Francisco.*

Gold Dredges

In 1897 the Risdon Iron Works, adjoining the Union Iron Works and soon to merge with it, built the first successful gold dredge in America. It was called the *Archimedes* and was designed by and built for R. H. Postlethwaite, chief dredging engineer for the Risdon Iron Works, who operated it in the Yuba River east of Marysville, Calif. The dredge was a success during its first year of operation. Then disaster struck. The Yuba River flooded and the *Archimedes* was lost.

A year later the Risdon Works also built a second successful gold dredge. This was known as the *Couch No. 1,* and was built for Captain Couch and W. P. Hammon, founder of the Yuba Consolidated Gold Fields. It operated for many

years in the Oroville Gold Fields and set the pattern for gold-dredging operations in California.

From 1897 to 1911 the Risdon Iron Works designed and built 63 gold dredges, many of which were shipped to mining fields in other parts of the world. During one year of this period Risdon was competing with Union Iron Works, right next door, in the construction of gold dredges. Union Iron Works turned out its first dredge in 1910, and in 1911 the two concerns merged. From that year up until 1929 Union Iron Works built 20 dredges, including a single order for five for the U. S. Smelting, Refining & Mining Company at Fairbanks, Alaska. These were built during the two-year period 1927 to 1929.

In 1929 the San Francisco Yard, successor to Union Iron Works and then a part of Bethlehem Shipbuilding Corporation, Ltd., built its last hydraulic suction dredge, the *Papoose.** In World War II this dredge saw service in the Pacific for the U. S. Army Engineers. All told, Bethlehem has constructed five dredges of this type, which are used primarily for harbor work.

Reverting to Union Iron Works and its history, by 1900 the yard had 1,785 feet of waterfront space and among its facilities were a machine shop, iron foundry, boiler shop, two blacksmith shops, joiner shop, copper shop, four shipbuilding slips with overhead cranes and a hydraulic-lift drydock.

On August 25, 1902, the Union Iron Works was sold to the United States Shipbuilding Company, but this company failed and two years later the Union Works was sold to a reorganization committee, from which it was acquired January 19, 1905 by Bethlehem Steel Corporation. Charles M. Schwab made the purchase for $1,000,000 at a public sale by the referee in bankruptcy, conducted from the steps of the office building at Georgia and 20th Streets in San Francisco.

During the earthquake of April 18, 1906, the hydraulic-lift-drydock was destroyed when the passenger vessel *Columbia,* then undergoing repairs in the dock, was shaken off the blocks and crashed through the dock platform into the water. On November 11, 1908 the properties of the San Francisco Drydock Company at Hunters Point and at 16th Street Wharf were acquired and plans prepared for a floating drydock capable of handling the largest vessel likely to enter the port of San Francisco.

In 1910 major yard improvements were started, which continued into World War I. The extensive additions and changes included addition of a one-piece wooden floating drydock with a lifting capacity of 6,500 tons.

Ships for World War I

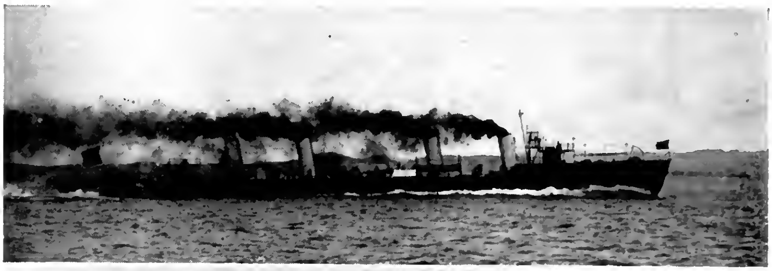
During World War I employment soared to 16,000, and the Union Plant built 12 submarines and also constructed and operated for the Navy the United States Destroyer Plant on the adjoining Pacific Rolling Mills property, earlier the site of Risdon Iron Works From this plant which came to be commonly known as the Risdon Plant, destroyers were delivered at the rate of three per month.

On October 15, 1917 Bethlehem Shipbuilding Corporation, Ltd., was incorporated, and soon after took over operation of the Potrero plant.

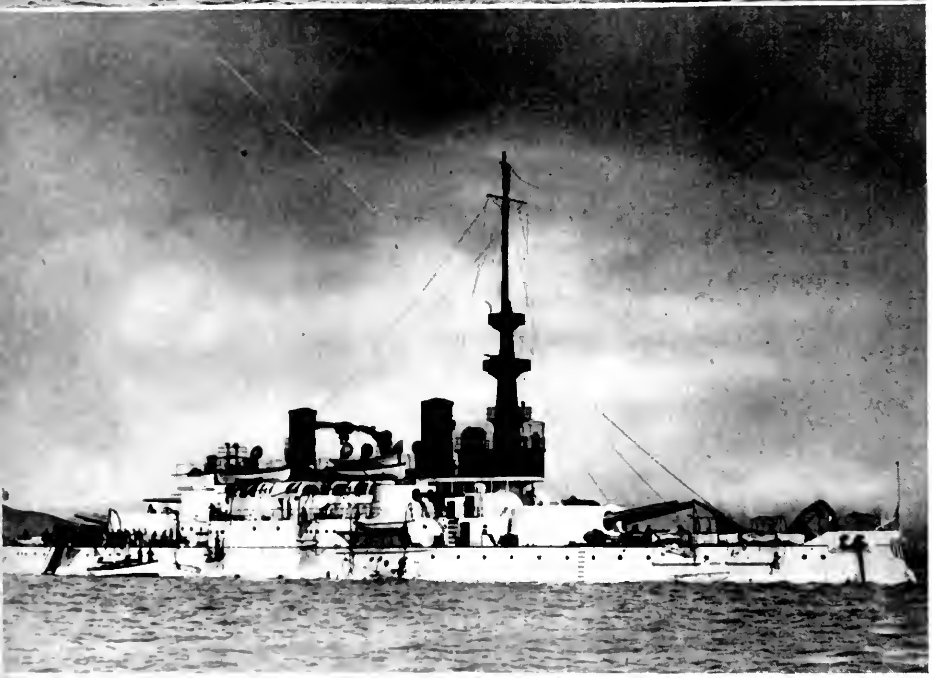
Eight Destroyers Launched in One Day

July 4, 1918, was a memorable day for the Union Plant. On that

Top: Destroyer "Preble," built in 1901.
Center: An early 2-man submarine undergoing test in the bay. Two vessels of this type, the "Grampus" and the "Pike," were built at the Union Iron Works in 1901. Gasoline engines gave them a surface speed of 8.47 knots.
Bottom: Tanker "George Loomis," built in 1896 for Standard Oil Company of California.



*Still in service. See Pacific Marine Review for September 1949.



date, with elaborate ceremonies, four destroyers were launched at the Potrero plant and four at Risdon, with keels laid immediately afterwards for four more such vessels at each yard. Mr. Schwab, then serving as director-general of the Emergency Fleet Corporation, delivered the principal address.

Post World War I Activities

Following World War I the Potrero plant, besides carrying on its normal ship-repair operations, built a large number of tankers and barges, and also several ships for the Inter-Island Steamship Company, in the Hawaiian Islands. The plant also undertook the construction of five C-1-B Maritime Commission freighters, one self-propelled hydraulic dredge, one towboat, five dredger hulls and nine pineapple barges. In 1938 two destroyers, the *Maury* and *McCall,* were delivered to the U. S. Navy.

Beginning November 15, 1938 Bethlehem shipbuilding and repair activities were carried out in the name of Bethlehem Steel Company, Shipbuilding Division, and the Potrero plant became known as the San Francisco plant and more recently the San Francisco Yard, as it is now called.

Some Accomplishments of World War II

When the Naval shipbuilding program was started in 1940 a complete new yard was built on the site of the old Risdon Yard. This was operated by Bethlehem, and it was at this "New Yard," as it came to be known during World War II that four high-speed anti-aircraft cruisers were built.

During the huge shipbuilding, ship-repair and conversion program that followed the outbreak of war in Europe, the San Francisco Yard increased its new construction and repair facilities, built 52 combat

Top: Cruiser "Olympia," Admiral Dewey's flagship at Manila Bay, May, 1898.

Center: The "Oregon," famous battleship of the Spanish-American War, built at Union Iron Works.

Bottom: "California," built in 1904.

vessels for the Navy, and repaired or reconverted over 2,500 Naval and commercial craft, including British, French, Russian, Dutch, Danish, Swedish, Greek, Yugoslav, Spanish, Mexican and captured Italian and German vessels, in addition to those under the control of the U. S. Navy and War Shipping Administration.

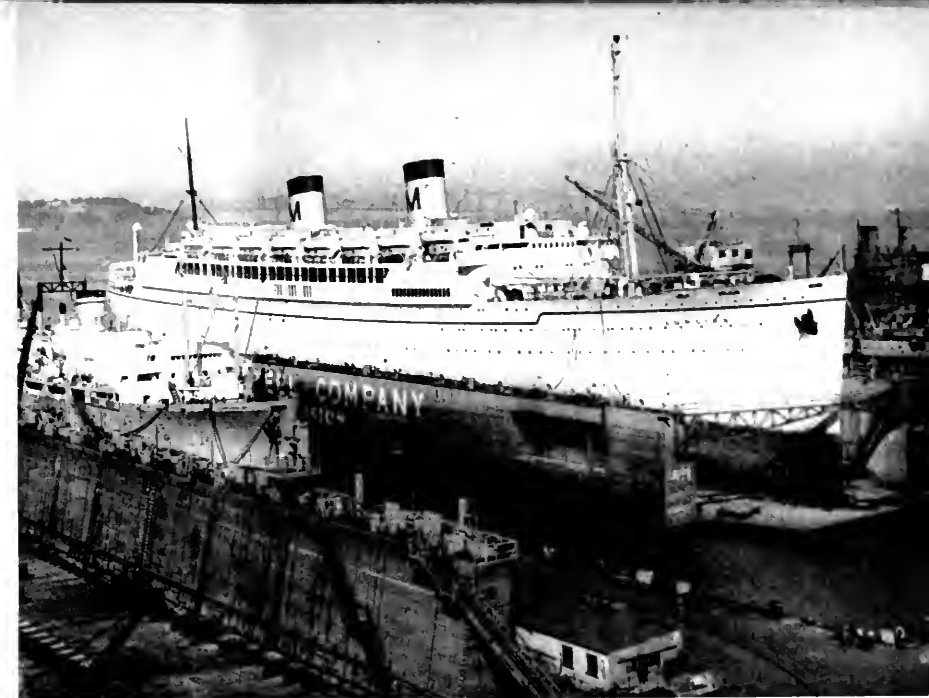
Probably the most outstanding achievement of the yard during the war was installation of a complete new secondary battery on the 33,100-ton battleship *Pennsylvania.* It had been estimated by others that five months would be needed merely to draw up the plans, and another six months to complete the job. The yard finished it in 88 days, to the Navy's complete satisfaction.

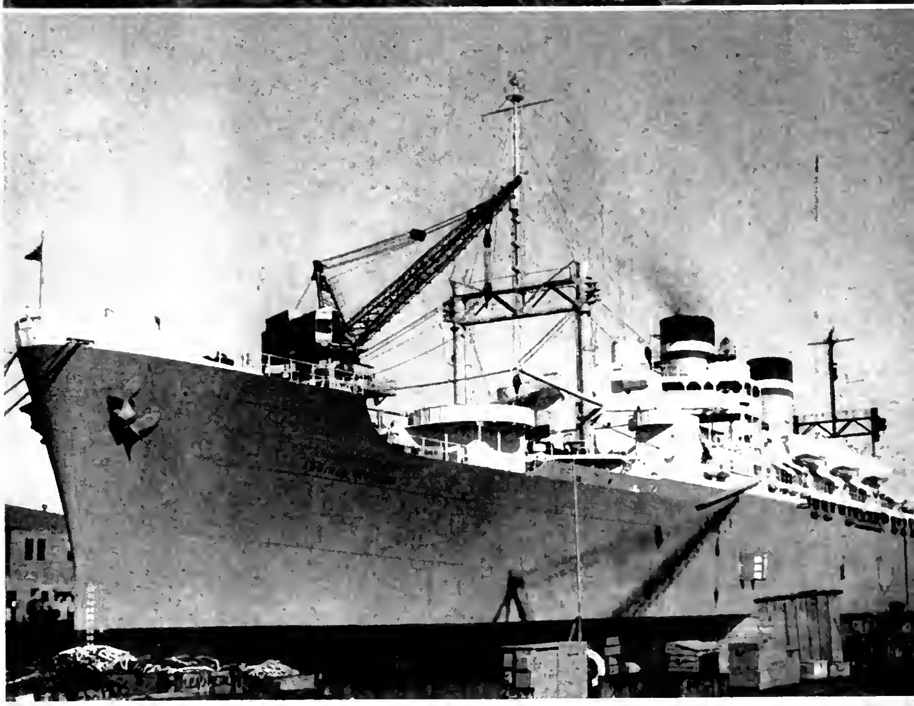
In 1941, when Bethlehem contracted with the Maritime Commission to build 10 P-2 type troop transports at Bethlehem-Alameda Shipyard, Inc., in Alameda, key men were loaned from the San Francisco Yard to help with this vital ship construction.

So pressing was the need for troopships in the early part of the war that the San Francisco Yard was asked to arm in only four days the luxury liners, *Lurline, Mariposa, Monterey* and *Matsonia* which had been ordered to San Diego to pick up a detachment of marines. The job was completed on time.

The yard also had the distinction of being the only privately-owned ship-repair yard in the country to operate a submarine repair base. At this yard, located at 16th Street, 31 undersea craft were completely overhauled between the time this yard was put into operation in the Fall of 1943 and the end of the war.

With the end of fighting, the San Francisco Yard again faced the transition from a wartime combat-ship construction and repair yard to





Top: S.S. "Lurline" on 22,000-ton floating drydock, San Francisco Yard.

Center: "Admiral W. S. Sims," built as a U. S. Navy transport vessel, but later converted to an Army transport.

Bottom: U. S. A. T. "Hermitage" ex S.S. "Conte Biancamano," the largest commercial vessel ever drydocked on the Pacific Coast.

normal peacetime ship-repair operations. When hostilities ceased, four 2,200-ton destroyers were under construction at the yard. Construction of two was carried to the launching stage, after which the ships were laid up and held in an uncommissioned state; the remaining two were scrapped on the ways.

Postwar Repair and Conversion Jobs

During the early postwar period, ship repairs and conversions took the spotlight. Outstanding among such jobs was conversion of the P-2's *Admiral Hughes* and *Admiral*

W. M. LAUGHTON,
General Manager of Bethlehem Shipbuilding Division on the Pacific Coast from 1945 until his retirement in May, 1949.

W. S. Sims from Navy Troop transports to transports to carry Army personnel and dependents to and from Pacific bases. These two ships, which had been built during the war at the Bethlehem-Alameda Yard, now carry far less than their war-time capacity of 5,000 troops each, but in much greater comfort.

Ship-repair activity at the San Francisco Yard during 1946 was highlighted by the virtual rebuilding of an entire half of a 96-ton crankshaft, largest of its type and the largest ever to come into any West Coast machine shop. This crankshaft was from the *Poelau Laut,* 535-ft. Dutch motorship powered by one of the three largest diesel engines afloat.

During 1947, the yard was called upon to perform many large and important ship-repair jobs. Early in the year a contract was awarded to renew, repair and refit over 65 per cent of the entire bottom of the *SS President Taft,* an 8,064-ton C-3 type freighter owned by American President Lines. The ship, first of six new postwar C-3's built for American President Lines' transpacific trade, had suffered grounding damage while sailing from New York to Panama.

In June of 1947 the San Francisco Yard was awarded contracts for the conversion of two C-3 Army troop transports, the *David C. Shanks* and the *Fred C. Ainsworth.* These two ships were converted from 100 per cent troopships to combination troop-and-passenger carrying vessels. This was the largest conversion job of its type to be performed on the Pacific Coast since the war.

Before 1947 was out, the San Francisco Yard was awarded additional contracts for similar conversion work on two other U. S. Army transports, the *Frederick Funston* and *James O'Hara,* and for the "safety-at-sea" conversion of the U. S. Army Hospital Ship *Comfort,* a C-1 type vessel.

The same year also saw the drydocking at the San Francisco Yard of the largest commercial vessel

T. C. INGERSOLL,
General Manager, San Francisco Yard, and of the Shipbuilding Division of Bethlehem Steel Company on the Pacific Coast.

ever to be handled on a floating dock on the Pacific Coast. The ship, the 24,416-ton Italian Liner *Conte Biancamano,* had been converted into the Army Transport *Hermitage,* following its seizure when Italy entered the war.

Bethlehem's San Francisco Yard is synonymous with many "firsts" and "largests,"—among the latter, the largest rigging job to be performed on a commercial vessel on

(Please turn to page 88)

Pacific Coast general offices of Bethlehem Steel Company, Shipbuilding Division, are located at 20th and Illinois Streets, San Francisco.

Singing Propellers

By William Lambie

SYNOPSIS

It is believed that any usual marine propeller will vibrate if operated at a slip ratio lower than that which corresponds to maximum efficiency.

In part I of the Paper a distinction is made between "whistling" and "singing" as applied to noisy marine propellers and a possible reason advanced for "whistling". It is noted that any such propeller may whistle or sing, or whistle *and* sing.

It is shown that a propeller having either ogival or airfoil sections, and whether mass-balanced or not, may whistle at any slip ratio if the trailing edges of the blades are not properly formed. Also a mass-balanced propeller operating at low slip will vibrate but will not necessarily whistle or sing; the vibration may be inaudible.

Part II discusses the operation of the LIBERTY type vessels, and suggests that owing to its incorrect dimensions, the vibration responsible for the many shaft failures in these vessels may be coming from the propeller. It is believed that the small stress raisers mentioned by the A.B.S. will assume much greater importance if the propeller is the source of the vibration.

The conclusion is reached that these vessels could be operated at 75 R.P.M. without danger of shaft failure provided the propeller were designed to and actually did operate at the proper slip ratio.

William Lambie addressing the Society of Naval Architects and Marine Engineers, Los Angeles, on "Singing Propellers."

PART I

PRIOR TO the introduction of the AIRFOIL section, propellers generally had been made with the shape of the blade disposed symmetrically about a straight line from root to tip, with the point of maximum thickness and the centroid of each section lying on this line; they were thus mass balanced about that straight line. The first "singing" propeller seems to have been one installed on the *Athelfoam* built by Cammell, Laird & Co., in England in 1930. They became really noticeable only after propellers with airfoil sections had come into quite general use. They were brought to the attention of Naval Architects and Marine Engineers principally by Mr. Harry Hunter, B.Sc.,[1] who pointed out that although called "singing" propellers, a more correct term would be "noisy" propellers, as in some of the ships the noise has been anything but "harmonious".

Quoting from the Aeroplane Industry, Mr. Hunter says "Airscrew noise is a very complex subject, and at present there are thought to be four kinds of it, namely (1) Flutter Noise, (2) Supersonic Noise, (3) Drag Noise, (4) Thrust Noise. Flutter noise is due to vibration of the blades and is evidence of structural inadequacy. Flutter must be prevented or the airscrew will fail structurally. Supersonic noise only arises when the tip speed approaches the velocity of sound. It is always associated with loss of efficiency, and is eliminated by keeping the tip speed well below the velocity of sound in air. Drag noise is due to either compressibility or vorticity effects and is mainly of high frequency. Thrust noise arises from the rotary pressure field associated with the airscrew and is stated to be the most disturbing kind of noise".

In a previous paper we stated that "only once had we found an ordinary ogival sectioned propeller to "whistle" and that one was so worn down at the edges by erosion on the blade faces that I believe each blade was fluttering"[2]. However, within the past year we have had a number of small propellers brought to our attention on account of their "whistling", although they were not of airfoil type, but had the general round back Ogival blade sections.

Most of these propellers, in our opinion, were of the correct dimensions for the Speed, R.P.M., and Power involved, and seemed to be operating at the slip corresponding to maximum efficiency. In searching for possible causes of the "whistling", no signs of erosion were noticed, but the trailing edges from Hub to Tip and the leading edges near the Tips were found to be somewhat square, that is, not

*Read at the meeting of the Southern California Section of the Society of Naval Architects and Marine Engineers, held at Wilmington, California, Sept. 20, 1949.

[1] "SINGING PROPELLERS." Harry Hunter, O.B.E., B. Sc., N.E.C. Inst., Vol. LIII, 1937.

[2] "CAVITATION AND THE PROPELLER OF MAXIMUM EFFICIENCY." W. Lambie.

rounded off. The noise emitted by these propellers was reported as a shrill whistle, and it disappeared when the edges had been ground quite sharp.

Since our experience with airfoil sectioned propellers caused us to think and state, that propellers did not sing or whistle when they were operating at the correct slip angle, we were quite surprised to receive that very complaint with regard to those small propellers. We had had no such troubles with our own ogival sectioned propellers, but they had quite sharp edges. It is thought possible that the water may have been flowing in streamline form over both sides of the blades of these "whistling" propellers without forming eddies, until it reached the trailing edge. Here, due to the relatively thick, square edge, the water would break away from streamline form and a more or less vacuous space would be left where eddies and bubbles would be formed. These bubbles, as the blade edge moved away from them, would collapse, but would not do so *on* the blade. They would be collapsing in water, and there would be no water-hammer blows on the blade, so it would not be vibrated. The occluded air would rush out of the water into the vacuous space left at the trailing edge and this entrainment of the air might conceivably be the cause of the "whistling" which would be the only sound heard.

Should we agree that this may be a fact, then it would appear that the material of which a propeller may be made will probably not be a factor contributory to "whistling".

In the past we have used the terms "whistling" and "singing" quite loosely to designate the sounds coming from a "noisy" propeller, but now we believe that there may be some propellers that "whistle", some that "sing", and still others that "whistle" *and* "sing". It therefore seems important that we distinguish between "whistling" and "singing" as applied to propellers.

Might we not conclude that in cases like those just mentioned, the propellers could be termed "whistling" propellers? They are not necessarily operating at incorrect slip, but whistle when the R.P.M. exceeds a certain amount because of the form of the edges. This noise may be akin to the drag noise mentioned in connection with air screws.

On page 190 of the original edition of his *Speed and Power of Ships*, Admiral Taylor, in discussing cavitation, wrote, "The case of cavities over the blade faces is different. They have no redeeming feature." It seems a pity that this statement, which we believe to be axiomatic, has not been included in the later editions of that monumental work. Face erosion we have always found to be accompanied by more or less serious vibration, and we find more propellers cavitating and vibrating because of operation at low slip than from lack of head or too high tip speed. We feel that such cases should not be dignified by any reference to the term Cavitation; they are just not of the correct dimensions for the conditions under which they may be working. It may be significant to note that in our own experience, "singing" propellers are never free from erosion on the blade faces. To us this indicates that such propellers are operating at a slip lower than that corresponding to maximum efficiency.

In the paper already referred to, [1] are given particulars of a number of cases of "noisy" propellers which were serious, and led to an investigation. They were referred to as Ship (A), (B), (C), (D), (E), and (F). Among them was that of a single screw passenger vessel 256′ x 36′ x 23′ driven by a triple expansion engine 22″ x 34½″ x 39″ stroke and developing 1900 I.H.P., at 102 R.P.M., giving the vessel a speed of about 13 knots. On this case, Ship (F), the Author reported that "in order to reduce the disturbing noise (from the propeller) which was annoying to the passengers, seventeen 1″ lead rivets were drilled in each blade. The row of rivets followed the edge of the propeller blade at a distance of 2 inches. The distance between the rivets was 4 inches. The result of this actually reduced the noise to a certain amount . . . very soon the lead rivets got slack and fell out, and when two or more rivets had fallen out, the noise increased in strength. It was noticed that it was always on the following edge that the rivets fell out. It was also noticed that when more than two rivets had fallen out there was a singing noise *After The Engines Had Stopped. This Noise Continued As Long As The Vessel Was Moving.*" The propeller was 14′-7″ diameter by 14′-3″ pitch with 73 Sq. Ft. blade area, but it is not stated whether it had airfoil or ogival sections. Even if the sections were ogival, we find that when absorbing the full Horse Power at 102 R.P.M., the slip ratio would probably be too low.

We believe it is likely that the propeller on Ship (A) would also operate at a very low slip ratio. Unfortunately the actual powers being used at the R.P.M. at which the other propellers "sang" were not reported, so accurate analyses are not possible in these cases.

Experiments carried out on marine propellers have shown that "similar vibration patterns are produced in air and water" [3], and that "in general, the nodal lines in air and water correspond very closely."

In 1934 Prof. Burrill "found that when vibrated in air, the propellers tested vibrated mainly in modes which were a combination of torsion and flexure i.e., vibrations of torsional-flexural type. The characteristic feature of these vibrations was that while the leading edge of the blade at the outer parts was stationary or relatively so, the trailing edge vibrated vigorously. The propeller blades in question were of markedly skewed mussel shape with wide roots and narrow tips and had airfoil sections at all radii; the end of the maximum thickness line being brought out somewhere forward of the actual tip of the propeller. A very high proportion of these propellers were "singing" propellers and as a result of the tests it was decided to attempt the design of blades having the same general characteristics in so far as blade width, section, etc., were concerned, but having the blade shape adjusted in such a manner that mass balance was secured about a central axis. To achieve this end, the centroids of the sections were arranged to lie on

[1] "SINGING PROPELLERS." Harry Hunter, O.B.E., B.Sc., N.E.C. Inst., Vol. LIII, 1937.

[3] "MARINE PROPELLER BLADE VIBRATIONS: FULL SCALE TESTS." Prof. L. C. Burrill M.Sc., Ph. D., N.E.C. Inst., Vol. 62, 1946.

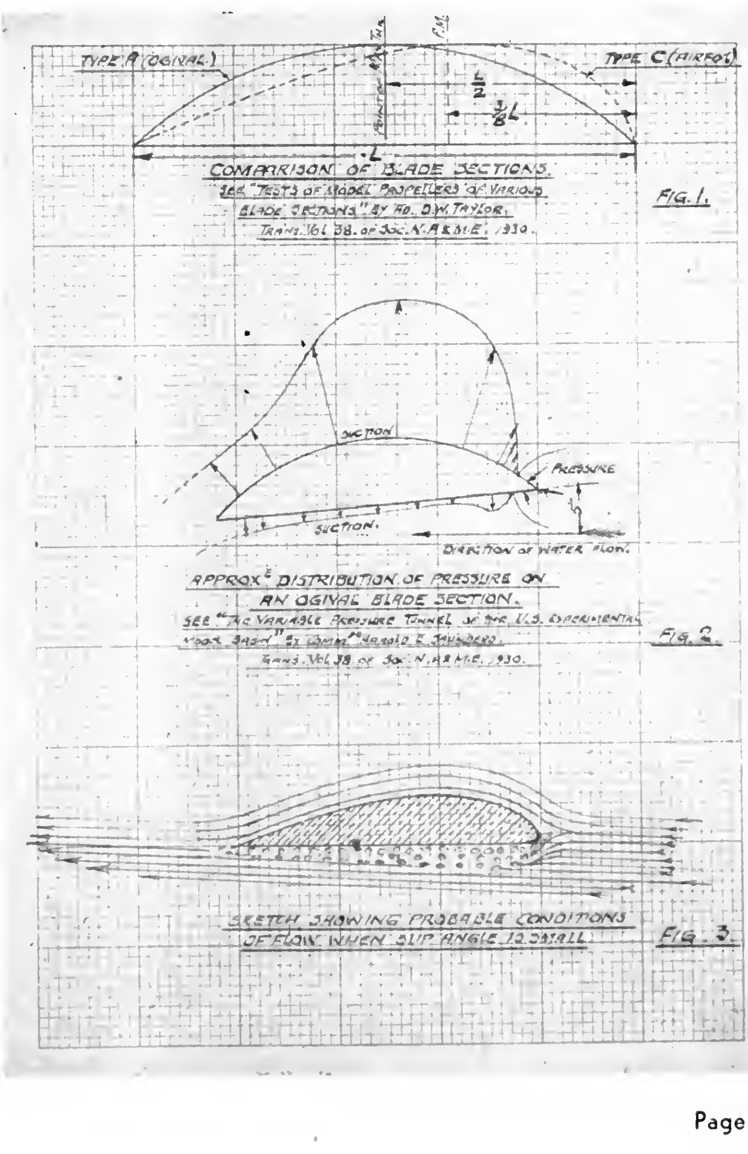
a straight line from root to tip. Propellers designed in this way, when tested with the aid of the electric motor referred to above, showed that so far as vibrations in air was concerned, this condition had been achieved. That is to say, natural vibrations of the blades in torsion appeared to take place about a more or less central axis and the flexural modes exhibited nodes having their extremities at approximately similar radii. Propellers designed in this way have proved, *in service,* to be quite silent. Other propellers not designed initially in accordance with the above principle, and which "sang" in service were found, upon modification in accordance with this method, to have become silent, and so far as large propellers for merchant ships are concerned, the above method of blade design appears to give entirely satisfactory results."[3]

In the paper from which the foregoing quotation is taken, the author was concerned exclusively with the "bell" aspect of the problem, no consideration being as yet given to the "clapper" or hydrodynamic cause of such vibrations.[3]

In our own case, beginning in 1933 we had marketed many propellers with airfoil sections, and a large percentage of them proved to be "singing" propellers. These propellers were made as closely as possible to the shape given in Taylor's Group C.[4] They had Airfoil sections from hub to tip, were of uniform pitch throughout, the blades were of elliptical shape with major axis touching the center line of the shaft, while the point of maximum thickness of each section was at a point 3/8 of its length from the leading edge. All of them had quite thin trailing edges and the patterns were cut to pitch by machine, and then each blade of the propeller was carefully measured and adjusted to the exact correct designed pitch all over. In every case which was reported to "sing", we found the operating slip ratio to be too low, and the blade faces in every case showed signs of erosion. In each of these cases the propeller became silent when the dimensions were changed so that it operated at the proper slip ratio. Not only did it become quiet, but the speed of the vessel was usually increased without increase of R.P.M. This again indicates that the slip may have been too low, and that prior to the alterations there was probably a suction instead of a positive pressure on the blade faces. Your attention is directed to Figs. 2 and 3 which show what seems to be happening when the slip is too low; the streamline flow breaks down and bubbles collapse *on* the blade faces. It is thought that since the marks of erosion show that they collapse *on* the blade, with great violence, we may conclude that these collapsing cavities are the agent exciting the vibration, which, in our experience always accompanies low slip. As shown in Fig. 1, the airfoil blade is quite thin towards the trailing edge as compared with the ogival section and it will flutter more easily on that account. A bronze propeller subject to furious bombardment of collapsing cavities would naturally hum like a bell, and the sound might be termed a "singing" sound in contrast to the "whistling" sound mentioned above as taking place due to the escaping

(Please turn to page 98)

Fig. 1. Comparison of blade sections.
Fig. 2. Approximate distribution of pressure on an ogival blade section.
Fig. 3. Sketch showing probable conditions of flow when slip angle is small.



[3]"MARINE PROPELLER BLADE VIBRATIONS: FULL SCALE TESTS." Prof. L. C. Burrill M.Sc., Ph. D., N.E.C. Inst., Vol. 62, 1946.

[4]"TESTS OF MODEL PROPELLERS OF VARIOUS BLADE SECTIONS." Rear Admiral D. W. Taylor, Trans. Soc. N.A.M.E. Vol No. 38, 1930.

Military Sea Transportation Service (MSTS)

THE new unified Military Sea Transportation Service was formally established on October 1, 1949 with the assignment of 94 Naval vessels to the composite command which has been set up under the Department of the Navy by order of Secretary of Defense Louis Johnson.

An additional 227 Army vessels will be progressively transferred to MSTS during subsequent months. Of this group, 125 vessels are presently assigned to Army overseas commands and 102 to the Army zone of the interior in this country.

The Naval vessels, including 16 fleet-type tankers, 12 cargo ships, 9 personnel transports, and 57 Government-owned tankers assigned to the Navy, were transferred en masse to MSTS on October 1.

Rear Admiral William M. Callaghan, U.S.N., and Rear Admiral A. J. Wellings, U.S.N., assume duty as commander and vice commander, respectively, of the new Military Sea Transportation Service, with headquarters in the Navy Department, Washington, D.C.

Four deputy commanders who will serve as field representatives of MSTS in four United States seaports, Seattle, San Francisco, New Orleans and New York, also assume their duties. They are Captain M. E. Eaton, USN, Seattle; Captain W. R. Thayer, USN, San Francisco; Captain T. J. Ryan, Jr., New Orleans; and Captain A. H. McCollum, New York.

In San Francisco Capt. A. H. Richards, Port Director for the Navy Transport Service, which office has been abolished, becomes Assistant Deputy Commander.

In the San Francisco Port, in addition to Capt. Thayer and Capt. Richards, there is Capt. John K. McCue as Director of Maintenance and Repair, Capt. Wiley in charge of inspection, Capt. Beasley in charge of operations, and Capt. Young as Medical Officer. All of these are Navy captains. Capt. Berry remains as Pier Superintendent and Raymond Coyne as Superintending Marine Engineer. Whether these latter functions are to be Army or MSTS will be determined shortly.

Navy port director offices in Seattle, San Francisco, and New York are disestablished, and their military and civilian personnel prorated for transfer on an equitable basis to the deputy MSTS commander and the Naval base or station at each port. In other seaports, Navy port directors will act for MSTS in matters coming under the cognizance of that command.

The Naval vessels being assigned to MSTS, in addition to the 57 Government-owned tankers, are:

Personnel transports—*General A. E. Anderson, General J. C. Breckinridge, General H. W. Butner, General W. A. Mann, General William Mitchell, General G. M. Randall, President Adams, President Jackson and President Jefferson.*

Cargo ships—*Achernar, Alshain, Andromeda, Chara, Diphda, Leo, Muliphen, Oberon, Oglethorpe, Thuban, Titania, and Virgo.*

Fleet-type tankers—*Auchilla, Chikaskia, Chipola, Kankakee, Kennebec, Manatee, Marias, Mattaponi, Merrimack, Monogahela, Nantahala, Neches, Severn, Tagula, Rappahannock, and Tolovana.*

The Army vessels will be transferred to MSTS at the four US ports where the Army maintains ports of embarkation: Seattle, San Francisco, New Orleans and New York. The Army Transportation Corps will continue to exercise complete operational and administrative control over each Army owned or operated vessel until such vessel has been formally transferred and the civilian crews assigned to MSTS payrolls.

The Army part of the transfer program will continue over a number of months, at least until April 1, 1950.

Under the program, the Army will continue to provide required military personnel afloat, including transport commanders, medical personnel and chaplains, until they are replaced by Navy military personnel; and

"General Nelson M. Walker," one of the P-2 type transports being transferred to the MSTS by the Army.

the Army will provide available shore military personnel as desired by MSTS on a temporary loan basis.

In general, the replacement of Army military personnel by Navy military personnel is to be accomplished by April 1, 1950.

Civilian personnel now employed either afloat or ashore by the Army Transportation Corps will remain under the administrative control of the ATC and under Army personnel regulations until they are transferred to Navy payrolls. In the case of Army civilian personnel afloat, they will remain under Army regulations for personnel afloat even after they are transferred to Navy rolls.

Rear Adm. William McCombe Callaghan

Rear Admiral Callaghan, born in Oakland, Calif., August 8, 1897, graduated from the Naval Academy with the class of 1919. He became Rear Admiral in 1943.

Rear Admiral Callaghan fitted out the USS *Missouri* and commanded that battleship from her commissioning, June 11, 1944, until May 1945. Under his command, that battleship, arriving in the forward area of the Pacific early in February 1945, participated as a part of Vice Admiral Marc A. Mitscher's famous Task Force 58 in the first mass air strike against Japan itself on February 16-17, furnished close support to carriers operating against the enemy stronghold of Iwo Jima, participated in the carrier strikes against Tokyo, February 25-27, and again struck at Iwo Jima on March 1. Later that month she took part with Task force 58 in a two-day sweep down the Japanese coast line, and on March 24, participated in the initial bombardment of Okinawa. While continuing operations against Okinawa, she was attacked on April 11 by a Kamikaze plane which crashed into the starboard side aft with little damage. The *Missouri* was still operating against the Japanese homeland when Rear Admiral Callaghan was transferred to duty on the staff of the Commander in Chief, Pacific Fleet.

He was ordered in September 1945 to the Office of the Chief of Naval Operations, and was assigned duty as Assistant Chief of Naval Operations (Transportation) and also Chief of Naval Transportation Service. He has just been named Commander of the new Military Sea Transportation Service (MSTS).

Rear Admiral Callaghan is a brother of the late Rear Admiral Daniel J. Callaghan, U.S.N., who was killed in action aboard the U.S.S. *San Francisco* during the Battle of the Solomons in November 1942.

Ports and Cargo

Under the directive issued by Secretary of Defense Johnson on August 2, the operation of *ports* does not become a function of MSTS but remains a responsibility of the separate services. The responsibility for the movement of cargo to the side of an MSTS ship also remains with the service owning the cargo. It will be noted that no part of the shoreside equipment, and no part of the control over passengers, troops, cargo, baggage or mail, goes over to MSTS. Also, all inland waterways vessels remain with the Army.

Functions and Responsibilities

Pursuant to the directive of the Secretary of Defense and subject to the authority and direction of the Chief of Naval Operations, the Commander, MSTS, will exercise direction, authority and control over the MSTS.

The MSTS will be responsible for:

The control, operation and administration of government owned vessels assigned, and all other vessels acquired for the purpose of providing *a carrier service of ocean transportation* of personnel and material for the Armed Services and, as authorized, for all other government agencies of the United States.

The establishment, control, and administration of organization units ashore, worldwide, necessary for the *administration and operation of MSTS.* (Existing organizations and facilities of the three Services will be utilized by MSTS as is practicable and necessary and as directed by the Secretary of Defense.)

The procurement of vessels outside the MSTS fleet by bareboat, time, and voyage charter, and the procure-

Major General Frank A. Heileman

General Heileman is Commanding General, Army Transportation Corps, Washington.

Capt. W. R. Thayer, USN

Capt. Thayer was graduated from the Naval Academy in 1923 and attained the rank of Captain in 1943.

After graduation and prior to World War II, Captain Thayer served mostly in submarines and destroyers. From 1932 to 1935, he had duty in the USS *Parrott*, then operating with the Asiatic Fleet. During the early part of this period his ship participated in operations on the Yangtze River and later took part in the China Campaign. In May, 1941, he assumed command of the Destroyer *Downes*, which was lost at Pearl Harbor. Captain Thayer was soon after assigned command of the USS *Jarvis* in which he received the Navy Cross for directing the sinking of a Japanese submarine.

In May 1942, Captain Thayer was ordered to the office of Chief of Naval Operations, where he served until January 10, 1945. He then returned to the Pacific where he assumed command of Destroyer Squadron 16. He remained in this command until the end of the war. His most recent duty was on the staff of Commander Western Sea Frontier, and he is now Deputy Commander of Military Sea Transportation Service, Port of San Francisco.

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ment of passenger and cargo space in commercial shipping as found necessary.

The establishment of an adequate system for reporting requirements for sea transportation of passengers and cargo, and for such other operational information as considered by MSTS to be necessary for the efficient employment of MSTS vessels, and for the chartering of commercial vessels and the procurement of passenger and cargo space in commercial vessels.

SHIP DESIGN

In coordination with pertinent government agencies, the preparation of recommendations for the *design, specifications, and equipment* of MSTS vessels. In collaboration with pertinent government agencies, the making of studies, analyses and recommendations for the improvement and standardization of sea transport control practices, procedures, reports, forms, and coordination of traffic movements.

SHIP REPAIR

The control and administration of maintenance, repair and alterations of all government owned vessels assigned to MSTS plus the maintenance and repair of vessels under bareboat charter. (Method of accomplishing will be the subject of separate directives.)

The preparation of plans for the employment and expansion of MSTS in time of national emergency. These plans will be based on the policies and directives issued by the Joint Chiefs of Staff (JMTC) and the Munitions Board. The execution of such plans requiring the services, facilities, and personnel of commercial sea carriers and negotiations therefor, are the responsibility of the Commander, MSTS, who will consult and coordinate with the appropriate agencies of the Department of Defense.

The development and maintenance, in consonance with policies and procedures approved by the office of the Secretary of Defense and the Department of the Navy, of such cost accounting records and operational statistics as will reflect the degree of efficiency and economy of the operations conducted by MSTS and show the utilization of funds, manpower and equipment assigned to MSTS. This information will be made available to all interested

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Capt. A. H. Richards, USN

Capt. Richards was graduated from the Naval Academy in 1923 and attained the rank of Captain in 1944.

After graduation and prior to World War II, Capt. Richards served mostly in submarines around the Mediterranean and in 1945 was ordered to duty in Washington, D.C. From there he assumed command of the U.S.S. *General W. A. Mann*. His most recent duty has been as Port Director of San Francisco. The office of Port Director in San Francisco is abolished under the reorganized transport service and Capt. Richards becomes Assistant Deputy Commander of Military Sea Transportation Service, Port of San Francisco.

Capt. A. H. Richards, USN

agencies of the Department of Defense.

The determination of the requirements of MSTS with respect to personnel, equipment, material, facilities and services, and advising the Chief of Naval Operations in these matters.

The preparation of budgetary and other fiscal requirements of MSTS as coordinated with participating agencies in accordance with directives of the Secretary of Defense on fiscal matters.

The administrative control of funds received by transfer, by reimbursement or received in payment for services rendered in consonance with policies directed by the Secretary of Defense.

The approval of stowage plans and their proper implementation. The Armed Service concerned will have representation with MSTS in the preparation of detailed stowage plans affecting the shipments made by that Service. The movement of Armed Services cargo to the side of the vessel is a responsibility of the Department owning the cargo. Stevedoring service will be arranged for by the port command when government port facilities are being utilized. Stevedoring service will be arranged for by the Department owning the cargo when commercial port facilities are used. The responsibility for the implementation and execution of loading and unloading rests with the activity furnishing the stevedoring services. The responsibility of MSTS for cargo *begins when the cargo is finally stowed on board and accepted by the commanding officer, and terminates when the cargo is accepted free on board ship at destination.*

The coordination between the Services and MSTS of the booking of passengers and cargo. The Armed Services concerned will have representation with MSTS in the approval of detailed plans affecting the movement of its personnel and cargo.

The control of all passengers on MSTS vessels. By agreement between MSTS and the Armed Service concerned, administrative control may be exercised through Commanders of personnel assigned by the Armed Service concerned. The responsibility of the MSTS begins when the passenger embarks on the vessel and terminates when the passenger disembarks from the vessel.

The coordination of MSTS activities with the administration, management and operational control of port facilities. Such harbor tugboats and harbor facilities as are available and are necessary in connection with the operation of vessels will be provided for the use of MSTS through mutual agreements of all departments concerned and as local conditions permit.

The protection of the rights and privileges of Civil Service personnel now employed by the Army and who may be transferred to the Navy.

Major General James A. Lester

General Lester is Commandant, Army Transportation Corps, Fort Mason, San Francisco. The Army continues all of its functions except the operation of seagoing vessels.

Capt. R. W. Thayer, USN, (left), Deputy Commander of MSTS for the Pacific; Colonel C. J. Wilder, USA, Deputy Commander, San Francisco Port of Embarkation, and Capt. A. H. Richards, USN, assistant to Capt. Thayer.

Official U. S. Navy Photograph

Conversions and Repairs

It is insisted by all officers consulted, including those in Washington, that there is no change contemplated in the method of assigning Army ships to shipyards for repair or conversion. They will be assigned to privately owned yards and will be repaired from local stocks of material. It is thought, however, that eventually local manufacturers and suppliers of repair parts and services will be in the hands of the Navy procurement departments and that they will be purchased through nationwide bidding. Thus much business will be lost to local outlets.

On the other hand through eventual unified purchasing it is likely that there will be an increase in purchases for former Navy vessels and this will in some measure make up for the lost business on former Army vessels. It is likely that all former Navy transports will be repaired or converted in Navy yards except when crowded conditions in such yards dictate the use of private yards.

Los Angeles To Build $6,000,000 Passenger-Cargo Marine Terminal

The world's most modern and efficient passenger-cargo marine terminal will be immediately constructed at Berths 195-199 Wilmington District, at a cost of $6,000,000, it has been announced by the Los Angeles Board of Harbor Commissioners. The new 46-acre facility, which will be a mile closer to downtown Los Angeles and be served by the new Harbor Freeway, will be preferentially assigned to the Matson Navigation Company, according to a joint statement issued by Ralph Chandler, vice president of Matson, and the Harbor Commissioners. It is expected that the project will be completed in early 1951.

The large passenger-cargo marine area will be 2,350 feet by 860 feet and will be served mainly by Alameda Boulevard north and south: and Pacific Coast Highway and Anaheim Street, east and west. The area is bounded on the east by the Los Angeles-Long Beach boundary and on the west by the Wilmington Boat Works. Avalon Boulevard is the main highway into the area.

Plans and specifications will be drawn immediately by Harbor Department Engineers, and advertisements for bids for initial construction will be issued within 90 days.

Three major projects are involved in this new facility for the Matson Navigation Company. There will be a new wharf 2,270 feet long and two new single-span overhead construction transit sheds. The first shed will be 200 feet by 1,200 feet, and the other, 200 feet by 500 feet. In addition, a parking area, ideally situated north of the shed and wharf area, will be arranged to handle 3,000 automobiles.

All structures in the new terminal will be of permanent fireproof construction. The facility will also be provided with modern rail, truck and roadway facilities for movement of cargo.

The large transit shed will have elaborate facilities on a second floor for passenger waiting rooms and access to *Lurline* side ports. Overhead passenger ramps to vessels will be electrically operated. Matson general offices will be provided separate from the cargo and passenger facilities.

The new concrete wharf will have a 38-foot concrete apron from shipside: the 200-foot transit shed floor; and on the north, a 12-foot canopied platform for low-line rail trackage and trucks.

The 46-acre area will be landscaped with palms, shrubbery and flower beds.

East basin, adjacent to the new facility, will be dredged to a depth of 36 feet and provide a turning basin. This will facilitate the berthing of the liner *Lurline* and other large vessels using the new passenger-cargo terminal.

The new Matson dock will give approximately 194 per cent more area than is used presently at berths 156-160. At first there will be a shedded area of 239,400 square feet, but this will be increased with the construction of the second shed, to a total of 339,400 square feet.

The area in Los Angeles Harbor on which the terminal for Matson is to be built.

The Tuna Clipper

By JAMES F. PETRICH

Editor's Note: Few, if any, articles of a technical character have the "human interest" angles which Jim Petrich put into his presentation on the tuna clipper before the Northern California Section, Naval Architects and Marine Engineers. Because he brings the designing of the vessel to life while developing his architectural decisions, we believe, as did his audience, that it brings added "clipper" understanding. Subsequent sections to be published deal with "The Fisherman and the Tuna Clipper" and also comments from the members of the Society. One such comment, on the insurance of tuna boats, will be found in this issue under "Marine Insurance."

The Architect and the Tuna Clipper

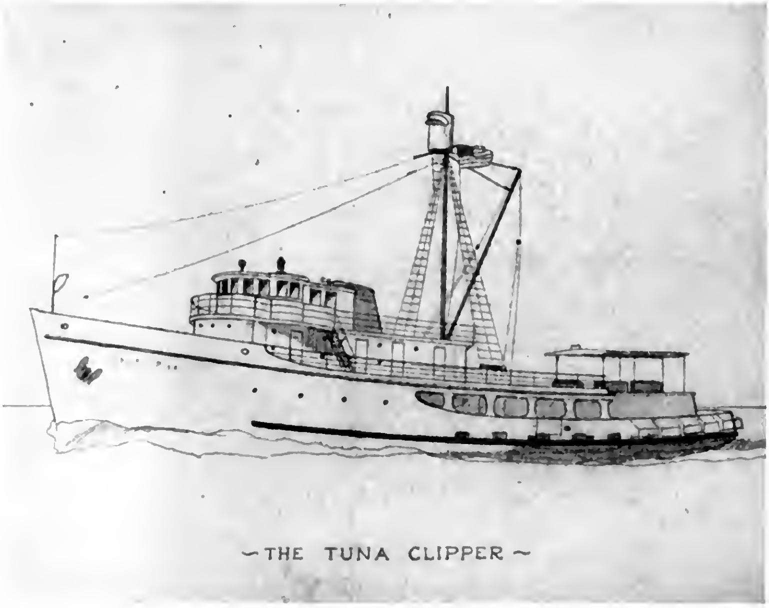
IT'S TEN O'CLOCK at night and the Naval Architect is wondering what kind of madness possesses him to come down to this cold office to work over a set of lines that he gets tired enough looking at during the daytime. If he felt like he was getting any place it wouldn't be so bad, but here he is going backward faster than forward. When he filled out Station 16 to obtain the area he wanted from his Sectional Area curve, he threw a bad kink in Waterline 10 and made the stern of his ship look like the back end of a bath tub. And here he had thought that he would be able to finish up fairing the lines tonight and pick off the offsets tomorrow, but now he thinks if he gets it finished next week he'll be lucky.

"Let's see, move this line a little . . . ". He wonders what makes him like this kind of work. This job had started out plain enough. The boss had decided not to stretch out the lines of a smaller hull design for which he already had the pattern, but to design an entirely new tuna clipper hull for this job and make it first class. And with that there was another job in his lap. He had settled first on a water line length of 115 ft., a prismatic coefficient of 0.60, and a little less dead rise and a slightly harder bilge than was customary. It must have been when he started thinking about the beam, and had talked the boss into widening it out to 29 ft. that this design had started to grip his interest. The extra beam would give his boat better inherent stability which is one of the most critical features of the low freeboard tuna clippers. It would provide more cargo carrying capacity which the fisherman always craves; and yet give him a chance to thin out the bow and stern without pulling the criticism that "The boat was all for speed and couldn't carry enough for her length." There would also be more deck space, and room for better accommodations. And even with the added beam, he felt sure that he could design a hull that would drive a knot faster than any conventional full-ended tuna clipper of the same size. At least he had told the boss that. Now it was up to him to work it out.

The more he thought about this new job the better he liked it. It was of a size that suited him, and from all his contact with the tuna fishing game it was the most popular size with the fishermen, too. Abour 122 feet overall, the vessel would be big enough to make the long trips to Galapagos and Panama easily and small enough to take a gamble on a couple of quick trips in the summertime if the local fishing looked very good. She would carry about 240 tons (short) of tuna in her 12 wells and 3 Deck boxes, and with the 650 h.p. main diesel engine that the fishermen wanted in her, she should bring the load home at a speed of 11½ knots. That would be about eight days from Galapagos, and most of the tuna clippers just make it in ten. It would be a good speed and make a fine boat, one that would keep a skipper proud.

"Even if I don't get these lines

Architect's drawing of the tuna clipper, reprinted from September issue.



faired-up tonight, the design is coming along pretty good," muses the Naval Architect as he seeks to excuse the evening's unaccomplished goal, and thinks to give up and go home. His draftsman had already laid out a preliminary Inboard Profile and Below Deck arrangement from which the boss has already picked off his lumber list. It would be a conventional tuna clipper in appearance, of course; perhaps a little more racy and modern. There is the raised deck forward which reaches all the way to the Deck Boxes aft, and on it the Deck House just forward of amidships housing all the crew accommodations. Over the deck house is the pilot house and chart room.

Below the Raised Deck forward are the forecastle head and the Upper Engine Room space leading aft through watertight doors, port and starboard, to the open deck space amidships. In this space are located the many hatches to the fish holds beneath, and in the center, just aft of the upper engine room is a spacious galley. The Forward, Middle and After Deck Boxes or Bait Boxes are built on the stern and have a stout overhead canopy. All about the stern are hung the racks from which the fishermen fish with hook and line. The deck aft rounds into a "cruiser" stern. Its advantage of better seaworthiness, thought the Naval Architect, far outweighs the advantage, much doubted, of better fishing from a square-sterned Tuna Clipper.

Below the Main deck, the space is taken up entirely with fuel tanks, machinery and fish holds. Forward is a 10,000 gallon fuel tank, its aft wall making a water-tight bulkhead with the hull. Aft of this is the engine room, small for the amount of machinery packed into it, but compact and well laid out. From the engine room a shaft alley extends all the way to the lazerrette in the stern and on either side of it are the fish wells and fuel and water tanks. There are twelve watertight refrigerated fish wells in all and besides being used to carry the fish cargo, four of the forward wells are also used to carry fuel oil on the outward trip, and four of the middle wells are used to carry the bait needed for hook and line fishing. Aft of the fish wells are two Fresh water tanks holding about 4,000 gallons and two stern fuel tanks holding 5,000 gallons. All told, the clipper will carry 35,000 gallons of fuel oil, enough to take her more than half way round the world.

As the Naval Architect locks the door to his office and walks down the stairs in the darkness, he tries to forget about the design. But it is no use. His mind always turns back to the tuna clipper. It is that way all the time now. He may be talking to a friend, and all of a sudden his mind will solve a tough piping arrangement. He may be looking at a movie, but his mind will be pondering over the best location of the ventilation fans. Sometimes he hardly remembers driving his car home from the yard because in his mind he is calculating the cruising range of the Clipper and measuring to see if the fuel carrying capacity is sufficient.

Well, he just can't help it. The tuna clipper is the most fascinating, romantic and intricate vessel ever built, in his opinion. He remembers the trip he took on a tuna clipper one summer — the warm tropical clear waters, the sunsets so painted with color they held him rooted and entranced for long minutes, the slow flapping steady pelican, the skiting flying fish, the twirling porpoise. He didn't look at them as through the window of an aquarium or from the deck of a passing liner. He was a part with them,—of the life of the sea. The porpoise and sea birds showed him where the tuna were. He shot the destroying black fish. He nimbly sidestepped the inquisitive nose of the shark. He stood in fishing racks that the waves made waist-deep in the water and fished tuna with his bamboo pole and line.

He remembers the first time he had gone aboard a tuna boat. The upper and lower engine rooms were packed full of noisy and whirling machinery. The shaft alley had frightened him. Long and narrow, its walls were covered with pumps and a maze of pipes—long ones, criss-crossed ones, curved ones. It took him years to understand the workings of all the intricate tuna clipper systems. Now he lives and breathes every one of them in this new tuna clipper.

There is the bait water system, for instance. A large 25 horsepower propeller pump pulls water from the sea and pipes it into each of the wells and Deck Boxes where the live bait is carried. This is the most important system in the operation of the boat, for the whole tuna clipper operation depends on the live bait which is used to attract the tuna. If the pump stopped for 15 minutes, the bait would die. Enough fresh sea water must be pumped to the wells and boxes to make a complete change of the water in them every 12 minutes; and in order to minimize the chance of ever losing the bait two bait pumps are installed, each capable of pumping the full volume of bait water required.

Proper refrigeration of the tuna catch is the next important operation on the tuna clipper, for there is no money in catching a full load of tuna fish if the fish are spoiled by the time they get to the cannery. Sometimes a boat may be out four months from the time the first fish is brought aboard, and during this time the fish must be kept in perfect frozen condition. This is done by what is called "brine freezing the fish". Tuna, as soon as they are brought aboard, are passed into a fish well filled with cooled sea water. The temperature in the well is then brought down to about 30°F. by means of ammonia refrigerant in 1¼" coils spaced 6" apart, which line all the inside faces of the well. After a day or so when the temperature throughout the well is uniform at 30°F. (and the well is completely full of fish), four or five bags of rock salt are added to the well to make a heavy brine solution, and the temperature in the well brought down to about 10°F. In two or three more days when the temperature is uniform throughout the fish, the brine solution is pumped into another well, or overboard, and the tuna kept frozen "dry" at this low temperature.

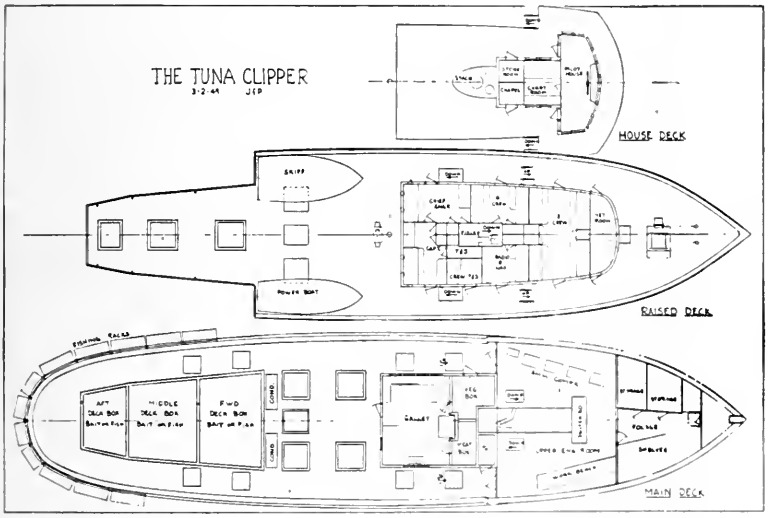
At any time during the fishing there may be several wells full of fish in different stages of refrigeration. To take care of this, three ammonia suction mains, each with

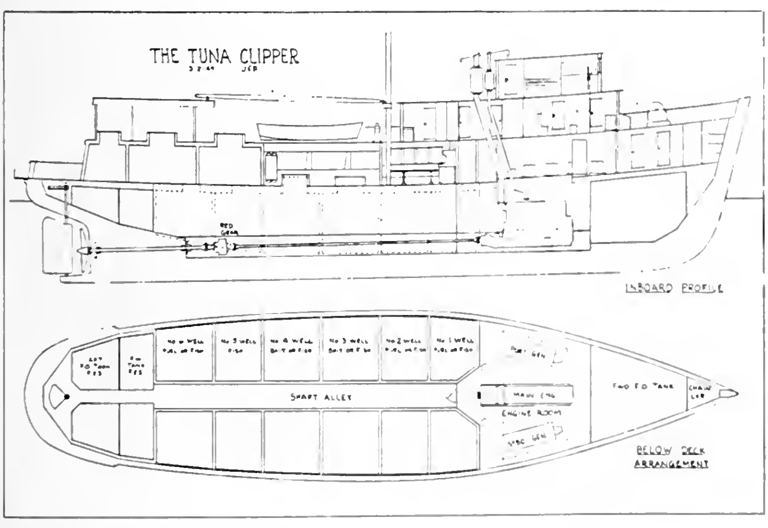
its own back pressure regulator, lead from the coils to the ammonia compressors: one main with the suction pressure for refrigerating sea water in the wells, one for refrigerating heavy brine, and one for refrigerating "dry" fish. Four 4-cylinder ammonia compressors handle the refrigeration of the 10,000 ft. of coils in all the wells, and large condensers, even when cooled with 95° tropical sea water, condense the full flow of ammonia gas.

Just as important as the ammonia coils in the brine freezing systems, are the brine circulating pumps. These 3 h.p. centrifugal pumps, one serving each well, circulate the brine from the bottom to the top of the well, during the freezing operation. This movement of the brine transfers the heat from all parts of the well to the coils and makes possible rapid freezing of the fish, a very important consideration in preserving the fish.

The large bait pumps are located in the lower engine room just ahead of the shaft alley, and the large pipes from them lead down the shaft alley to each of the bait wells and deck boxes. The ammonia compressors are installed in the upper engine room on the port side, and the condensers are aft on the main deck just forward of the deck boxes. The brine circulating pumps are mounted in the shaft alley and serving them is a myriad of piping to circulate and transfer and dump the brine. Also installed in the upper engine room is the main switchboard serving the power and lighting circuits, the ventilation fans, the six CO_2 bottles for the fire fighting system, and on the starboard side, the lathe, drill press, grinder and tools of the engineer's workbench.

Deck and profile arrangements of the tuna clipper.





In the lower engine room are located the many other pieces of machinery for the operation of the tuna clipper. As hull space, used for carrying the fish cargo, and fuel oil, needed for the long trips, is of prime importance, the engine room is crowded by fish wells aft and by the large fuel tank forward. In this small space must be carried the intricate fuel oil transfer system, which moves the fuel to and from the many tanks to be consumed by the engines and to keep the vessel in just the right trim for the fishing operation: Here are the lube oil tanks and pumps, the bilge pumps, fire pumps, air compressors and receivers, steering engine, fresh water and salt water sanitary pumps. On the port and starboard sides are the two 440 volt 100 KW diesel generating sets, either one able to carry the full expected electrical load. Each piece of machinery is chosen for its ability to withstand the great heat in tropical waters. Motors and generators are specially treated for the high temperatures and are made drip-proof and covered with Class A insulation. Pumps have bronze impellers with monel shafts. Heat exchangers and oil coolers are built of corrosion-resistant copper-nickel alloys.

In the center of the maze of machinery is the main engine, a medium speed diesel turning 600 RPM and developing 650 horsepower. The architect smiles with a bit of pride in his profession as he drives into his driveway and thinks about the story behind choosing that engine.

The fisherman thought originally to have a supercharged engine to put a little "more power" into his boat. When the fisherman talked to him about it, he suggested putting the money into a reduction

(Please turn to page 99)

Rigging Standards
--- And Their Relation to Safety

The Federal Security Agency's Bureau of Employees' Compensation provides some startling figures on shipyard and dock casualties, and entirely apart from the human interest, the financial interest justifies every possible effort toward prevention.

Work injuries to shipyard repairmen and off-shore stevedoring employees, reported during the first six months of 1949, are estimated to cost the Marine Industry at least $3,000,000 in compensation benefits exclusive of property damage and other indirect charges.

A total of 39,188 injury cases was reported, including at least 8,969 disabling and 82 fatal injuries. Of this number 13,549 workers were longshoremen and 25,629 were doing ship repair work. Forty-seven of the death cases involved men doing off-shore stevedoring work. The injuries involved at least 720,000 chargeable days of disability.

The Industrial Indemnity Company of San Francisco, with branches in other Coast industrial centers, has published a fine booklet entitled "Rigging Standards for Longshoremen and Harbor Workers" which is a 48 page

STAYS

Safe Load in Pounds for New Plow Steel Wire Rope suitable for Stays

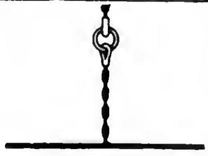
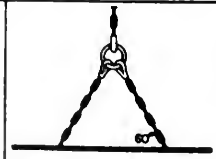
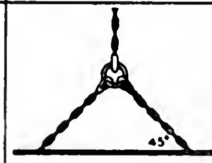
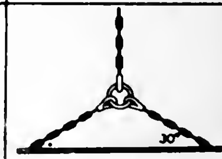
6 Strands of 7 Wires, Hemp Center

Diameter in Inches	Weight per Foot in Pounds	Safe Load Pounds	Diameter in Inches	Weight per Foot in Pounds	Safe Load Pounds
1/4	.10	940	3/4	.84	7,900
5/16	.15	1,400	7/8	1.15	10,700
3/8	.21	2,000	1	1.50	13,900
7/16	.29	2,700	1-1/8	1.90	17,400
1/2	.38	3,600	1-1/4	2.34	21,200
9/16	.48	4,500	1-3/8	2.84	25,400
5/8	.59	5,500	1-1/2	3.38	30,000

When ropes are galvanized deduct 10% from strength shown above

CHAIN

Safe Load in Pounds for New Wrought Iron Chain Slings

Diameter of Link Stock in Inches	Single Chain Vertical Lift	Sling or 2 Chains — used at 60° angle	Sling or 2 Chains — used at 45° angle	Sling or 2 Chains — used at 30° angle
				
1/4	1,000	1,800	1,500	1,000
3/8	2,300	4,100	3,300	2,300
1/2	4,200	7,300	6,000	4,200
5/8	6,600	11,400	9,300	6,600
3/4	9,500	16,500	13,500	9,500

Avoid angles less than 45°.

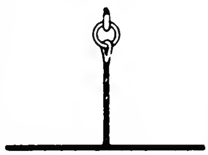
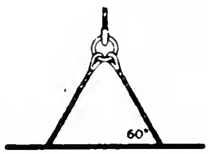
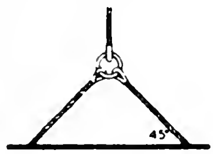
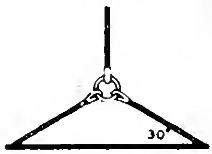
WIRE ROPE

Safe Load in Pounds for New Improved Plow Steel Hoisting Rope
6 Strands of 19 Wires, Hemp Center

Diameter in Inches	Weight per Foot in Pounds	Safe Load Pounds	Diameter in Inches	Weight per Foot in Pounds	Safe Load Pounds
1/4	.10	1,100	1	1.60	16,000
5/16	.16	1,800	1-1/8	2.03	21,200
3/8	.23	2,500	1-1/4	2.50	26,000
7/16	.31	3,300	1-3/8	3.03	31,400
1/2	.40	4,300	1-1/2	3.60	37,000
9/16	.51	5,400	1-5/8	4.23	43,200
5/8	.63	6,600	1-3/4	4.90	49,600
3/4	.90	9,400	1-7/8	5.63	56,800
7/8	1.23	12,800	2	6.40	64,400

Safe Load in Pounds for New Improved Plow Steel Wire Rope Slings under Different Loading Conditions

6 Strands of 19 Wires, Hemp Center

Size Diameter in Inches	Single Wire Rope Sling Vertical Lift	Sling or 2 Wire Ropes — used at 60° angle	Sling or 2 Wire Ropes — used at 45° angle	Sling or 2 Wire Ropes — used at 30° angle
				
3/8	2,500	4,300	3,600	2,500
1/2	4,300	7,400	5,800	4,300
5/8	6,600	11,400	9,400	6,600
3/4	9,400	16,200	13,000	9,400
7/8	12,800	22,100	17,400	12,800
1	16,000	27,700	23,200	16,000
1-1/8	21,200	36,700	29,700	21,200
1-1/4	26,000	45,000	36,200	26,000
1-3/8	31,400	54,300	43,500	31,400
1-1/2	37,000	64,000	52,200	37,000

Avoid angles of less than 45°.

compilation of load limits, equipment standards, connection efficiency, safeguarding requirements, and many other types of safety information, and the *Pacific Marine Review* is privileged to reproduce certain of its text and charts for the benefit of the industry as a whole. The material will continue to appear from month to month.

The Mechanical Cleaning of Fouled Heat Exchanger Tubes

By A. JOHN

Assistant General Manager, Thomas C. Wilson, Inc., Long Island City, N. Y.

FOR MANY YEARS in the past, mechanical cleaning of badly fouled heat exchanger tubes was done on an improvised basis. The methods were limited to the handiest tools readily available which usually consisted of drills of various sorts or standard boiler tube cleaning equipment. The drills approached the power problem from an external application while the boiler tube cleaners approached the power problem internally. Boiler tube cleaners, the motors of which enter the tube, were found rather lacking in power when heavy deposits and plugged conditions prevailed. The improvised drills, while doing a job more rapidly, generally produced mediocre results although some methods do deserve honorable mention. In spite of the various methods and the results, information was not generally made available to others with similar problems. Whenever a problem existed and was more or less solved, it was generally confined within the plant or at best, the information was passed along on a word of mouth basis. Undoubtedly, many maintenance men used similar methods but unknown to each other, the knowledge of which if pooled together would have been of inestimable value.

When tubes are not badly fouled, or not plugged, other methods than strictly mechanical ones have been used. Although those in the trade do not necessarily agree that sand blasting, pickling and steam, hydraulic or air lancing comes within the scope of mechanical cleaning a word in this respect will nevertheless be of general interest. These methods have been tried at various times and in many cases are superior to mechanical methods. For instance, in a bank of condenser tubes where deposits are negligible or of the muddy or river growth type the practice of shooting rubber plugs is superior both in speed and performance. This method is only for the removal of soft deposits and obviously will not remove hard scale. The other methods mentioned have been successfully used at various times and some of them are the only ones available for the cleaning of the shell side of heat exchangers.

Obviously, prior to the consideration of any mechanical cleaning method, hand methods with brushes and scrapers were also involved. The hand method may still have its occasional place but it can be considered as out-moded in heavy industry.

During the past ten years many additional plant processes have been developed utilizing heat exchangers more and more extensively. Thus, the incidence of fouling troubles greatly increased and since production was a byword its incentive applied to tube cleaning as well. This created the impetus to concentrate on the development of a special mechanical tube cleaner, particularly one to remove very heavy scale deposits and also to open up plugged tubes. Many improvements of mechanical cleaning methods manifested themselves during this period and ultimately a high speed direct drive, scavenging drill type cleaner was successfully developed and marketed.

Fouling and Characteristics of Scale

The heat exchangers to be cleaned are generally located in process industries such as oil refineries, fruit and vegetable juice, synthetic rubber, plastic stock, paper pulp, dairy and miscellaneous chemical plants. The tubes of these heat exchangers are predominantly straight and without return bends, although some tubular return types exist. The majority are mounted in a horizantal manner providing a convenient approach from the cleaning viewpoint. Commercial tube sizes range from ½" O. D. to 2" O. D. with the ⅝" to 1" O. D. range predominating. Lengths vary from 18" up to 30' and occasionally longer.

Vertical installations also exist such as the open head shell and tube condensers found in refrigeration plants and sulphite evaporators in pulp mills. Although not heat exchangers of the liquid type, air preheaters, as installed in boilers, can be considered as coming within the scope of this paper. The tube lengths of vertical installations generally run up to approximately 50 feet. Where such air heaters are installed horizontally, the tube lengths average approximately 8 feet.

The fouling of heat exchanger tubes is generally caused by localized high temperatures, precipitation of solids at high or low temperatures, low velocity of flow through tubes, cutting units off steam with the normal settlement of solids and the congealing reaction of certain liquids. In respect to boiler air preheaters the most common cause of serious fouling is a change of fuel firing, such as from coal to oil or vice versa without time taken out for cleaning. The small amount of gummy residue, deposited when burning oil, combining with fly ash ultimately tends to form into a solid mass. However, it is believed that the lack of periodic preventive maintenance can be considered as the greatest cause of the complete fouling of the majority of heat exchangers.

The type of scale deposited covers a wide range from flint hardness to soft and gummy. Interspersed are conditions such as, (in all ranges of hardness) porous or cellular, compacted but elastic, adhesive or gummy, blistery, etc. Some scales adhere to the metal walls with such tenacity as to be difficult to remove cleanly while some are readily dislodged once the internal pressure of

* Paper prepared for presentation at a recent meeting of the American Society of Mechanical Engineers.

being compacted is removed. A myriad of chemical compositions exists such as calcium compounds, carbonates, sulphates, polymers, coal tar, solidified fatty acids, miscellaneous chlorides, algae and other organic matters as well as common iron oxide.

Each type of scale presents a different problem of removal, especially as to the proper combination of tools and methods. Past experience is also a determining factor and must not be overlooked.

The Direct Drive Air Operated Mechanical Tube Cleaner

One tube cleaner that has been developed and that has proven very popular is known as the outside suspension type and in general appearance resembles an electric drill. It consists of a high powered air motor operating outside of the tube bundle transferring power through a hollow rotary shaft to which is attached a special drill bit, brush or other suitable accessory. The hollow rotary shaft provides a means of introducing a scavenger such as air, water or steam under pressure direct to the point of cutting and serves to soften the fouled matter, wash away the debris or to keep the cutter bit cool. Accessories are devised so as to allow passage and exhausting of the scavenger medium as close to the point of cutting as possible. This cleaner has proved to be a boon to many harassed plant engineers and due to light weight and portability it provides an "on the spot" method of rapidly removing scale and other fouling matters. This type of cleaner also provides the only effective method that can be used to clean tubes that are solidly plugged.

Finger tip control is provided for a variety of speeds and at present two types are manufactured. A light duty unit suitable for one hand operation is available weighing three pounds and a heavy duty unit is also manufactured that weighs seventeen pounds. The same accessories can be used with either cleaner within the similar size ranges. The light duty cleaner is generally used on short tube heat exchangers from ¼" inside diameter to ⅞" inside diameter. The heavy duty cleaner is suitable for tubes as small as ⅜" inside diameter and up to 2" inside diameter. Under ideal light scale conditions and where production warrants the application or the equipment happens to be available these ranges can be somewhat extended. For instance: it is recalled that the heavy duty cleaner was used to brush out a quantity of 3" outside diameter straight tubes that have become rusted or otherwise fouled to a moderate extent.

The hollow rotary shaft of the cleaner is made in lengths to suit the heat exchanger being cleaned. Where heat exchangers are located close to walls or otherwise obstructed and sufficient head room is not available, shafting can be supplied in short lengths and coupled together as progress is made. The normal flexibility of the shafting, in any length, is sufficient to follow the contour of sagged tubes. The cutter bit is usually a rear piloted type and, coupled with the limberness of the shafting, normally stays within the confines of the inside diameter of the tube. A slight whipping action is perceptible at the highest rotary speeds when using long shafting. This action has no bearing on the results or the normal operation of the cleaner but there is evidence that the possible contact of the shaft with the tube wall has a tendency to remove residual scale deposits that may have been left after passage of the cutter bit.

Normally, constant forward pressure on the cleaner is satisfactory during cleaning. However, occasionally when flint- like deposits prevail, a vibratory attachment can be used which greatly facilitates progress. This attachment, used with the heavy duty cleaner only, creates a staccato of sharp blows, insufficient in intensity to cause buckling of the shafting but intense enough to dislodge scale in sizeable chip form. Blows average approximately 1900 per minute and occur simultaneously with rotation. An analogy can be made to the well known air operated rock drill or paving hammer. The vibrating attachment also reduces the laborious aspect of a difficult problem by approximately 60%. Records indicate that approximately 15% of the cleaners sold are provided with this attachment.

Drill bits are of a special compounded alloy steel capable of sustained operations even under temperatures approaching 600° to 700° F. They are generally three or four fluted in design and ground at a cutting angle of approximately 120°. The cutting edges are not keen but rather stubby and are ground with reverse rake angles. Although this cutting edge is standard, it has been found that many operators grind the bits to suit their personal whims or to what is compatible with the cleaning operation being performed. Occasionally on some plugged tubes auger type bits are used when the deposit is spongy and of a rubber-like consistency. Records indicate that very seldom are conditions alike plant to plant, and some

allowances must be made and time allotted for proper analysis. However, on hard deposits the fluted style of bit has proven the most popular. When tubes are not plugged and deposits are soft or powdery, expanding brushes or expanding cleaners of a scraper type can be satisfactorily substituted.

The selection of a suitable scavenging medium is also important but, as is quite often the case, must be what is available at the plant. Mainly due to their general availability air or water seem to be the favorite scavenger mediums. Occasionally, hot water and steam are used, particularly on deposits that may soften under high temperatures. However, steam has the disadvantage of condensing rapidly, thus reverting back to a hot water medium. Condensation is particularly rapid when long tubes are encountered and the steam source is a considerable distance away.

It is recommended that scavenger pressures be high enough to overcome forward thrust or feed pressure of the cleaner. If the scavenger pressure is not higher than the feed pressure of the exhaust, holes in the drill bits may become clogged, particularly if the tubes are plugged. It has also been ascertained that when tubes are plugged the smaller the tube being cleaned the greater the scavenger pressure that is required. In order to allow the debris to be forced back toward the tube mouth the outside diameter of the rotating shaft must of necessity be smaller than the inside diameter of the tube being cleaned. This restriction limits the volume of scavenger under moderate pressures and consequently, to provide for a rapid exit of debris, pressures must be increased. When tubes are not plugged, pressure may be lower and

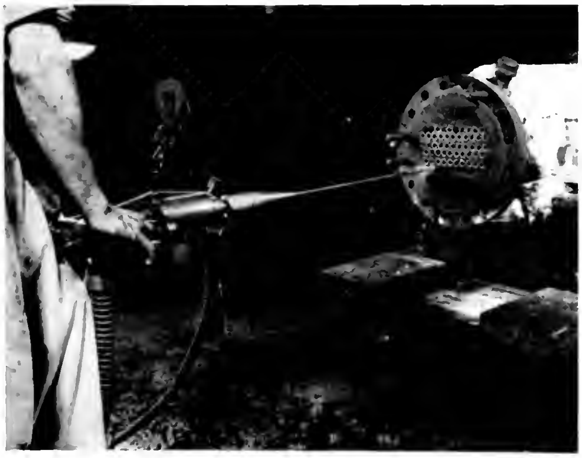


Fig. 1. Heavy duty tube cleaner.

in many cases a trickle of water at city pressure will effectively wash out the debris. Records indicate that water pressures as low as 30# PSI and as high as 225# PSI have been effectively used. Air pressure is usually limited to the available source which in most cases is 125# PSI. It should be noted that no definite rule can be set and recommendations are generally made from experiences of the past.

Once the proper method is established it should be recorded for future use, thus eliminating further experimentation by the cleaning group. Also, periodic cleaning schedules may be established in order to eliminate sudden process stoppages and in many cases eliminate retubing.

Various Cleanouts and Results

The actual operation is rather a simple and convenient one as can be noted from the accompanying photograph of the heavy duty unit, Figure 1. This photograph depicts a heat exchanger of approximately 15′ in length with 1″ outside diameter solidly plugged tubes. The deposit was fairly hard but the tubes were cleaned at the rate of three minutes each. Although the photograph shows this heat exchanger removed from the line, this practice is seldom carried out. Very seldom do reasons exist for not cleaning the heat exchanger at the installed position. One of the fastest recorded times, with a similar heat exchanger, occurred in a Michigan chemical plant. The tube bundle was similar to the photograph but a slightly different scale deposit was found. The deposit was hard but not compacted and although the cutter bit progressed rapidly, the debris was not exhausted satisfactorily with air scavenging. Cold water at a pressure of 140# was tried with the result that each tube was cleaned in one and one quarter minutes.

Recently a battery of approximately eight heat exchangers at a Pennsylvania Refinery became solidly plugged with a flint-like deposit. The cleaning crew was doing the best that could be accomplished with the existing tools. Due to unusual conditions the best was not satisfactory and a faster method was sought. In a general discussion retubing was even considered as being faster than existing methods of cleaning. A very unusual condition prevailed in this battery of heat exchangers as the majority of the tubes were plugged for approximately three feet from each end. This was probably due to localized heat at the terminal ends but since this condition was effective in stopping circulation the units had to be taken off steam for cleaning.

The results mentioned are only a few accomplished with the heavy duty cleaners. The light duty cleaners, Figure 2, have a similar record of performance. In a New Jersey soap plant a short heat exchanger was slowing down in performance. Records indicated that this heat exchanger had not been cleaned in approximately eight years and that the hard water used was the cause of the fouling. The heat exchanger was mounted in a very awkward position in respect to retubing or replacement, an operation which would take approximately one week. The light duty cleaner performed the cleaning operation, at an invested cost in tools of less than $125.00, in approximately sixteen hours without seriously hampering process operations. Normally, a heavy duty cleaner would have been recommended and the job could have been halved in time. However, due to the general inaccessibility of the heat exchanger, the lighter cleaner seemed more practical.

In a nationally known electro-chemicals plant at Niagara Falls, the same type of light duty cleaner provided a cleanout in one half hour, an operation that formerly took five to eight hours by previous manual methods. Since this cleaning was necessary every week, the sav-

ings are obvious and in fact, with a few cleanouts, the savings amortized the basic cleaner cost.

Electrically Driven Flexible Shaft Tube Cleaners

Electrically driven flexible shaft cleaners have been found satisfactory for use in confined quarters or where compressed air is not readily available. This type of cleaner is also popular for cleaning the vertical open head shell and tube condensers in refrigeration plants. It may be well to point out that in an ammonia compressor plant, enormous savings in electric power used for compression are not only possible but an actual fact. It has been ascertained that even after hand cleaning a substantial amount of the deposit remains and that a follow up with the mechanical cleaner removes enough additional deposit to reduce the ammonia head pressures between 10 and 25 pounds. Taking a pressure reduction of 25 pounds into consideration, a 300 ton per day ice plant,operating 300 days a year,could save approximately $7,500 yearly in electrical power alone, a saving that more than pays for cleaning equipment and the labor involved during the course of a year.

When cleaning the open head shell and tube condensers in a refrigeration plant with electrical equipment no scavenging operation is necessary. The condenser can be cleaned without process stoppage and while the cooling water is in circulation. Since the circulation is downward, the debris is carried to the bottom sump and generally can be readily removed.

The electrically driven cleaners range from 1/4 H. P. to 1 1/2 H. P. and can be furnished with prevailing electrical characteristics. Tubes of 1/2" to 4" I. D. can be cleaned. Quite often remote push button control devices are featured. Flexible shafting is manufactured in standard lengths from 15 feet to 35 feet in 5 feet additions, the most convenient length being roughly five feet in excess of the tube lengths being cleaned.

Cleaning of Return Bend Type of Heat Exchangers

The discussion on the herein mentioned cleanouts particularly applies to the non-return bend type of heat exchanger. The necessity for cleaning the return bend type of heat exchanger does not often exist as the majority of such installations are located in non-fouling processes. If serious fouling conditions are anticipated, designers will invariably specify that the straight tube, non-return bend type of heat exchanger be installed. The "U" bends of the return types are the restricting factors. They are difficult to clean and the majority of times impossible mechanically. However, if return bend types do need cleaning and providing the radius is generous, it is occasionally possible to do so by means of flexible attachments. These attachments are inserted, on both the air or electric cleaners, between the shafting and the cutting tools and, again depending on the radius, will completely negotiate the U bend from one side or will clean half way. The other half of the U bend can then be cleaned through its corresponding section of straight tube. However, this is only practical if the deposit is fairly soft, the tubes not completely plugged, or at least not plugged with a very hard deposit. Cleaning can be by either the air or electrically operated units.

Standard Air, Water or Steam Driven Boiler Tube Cleaners

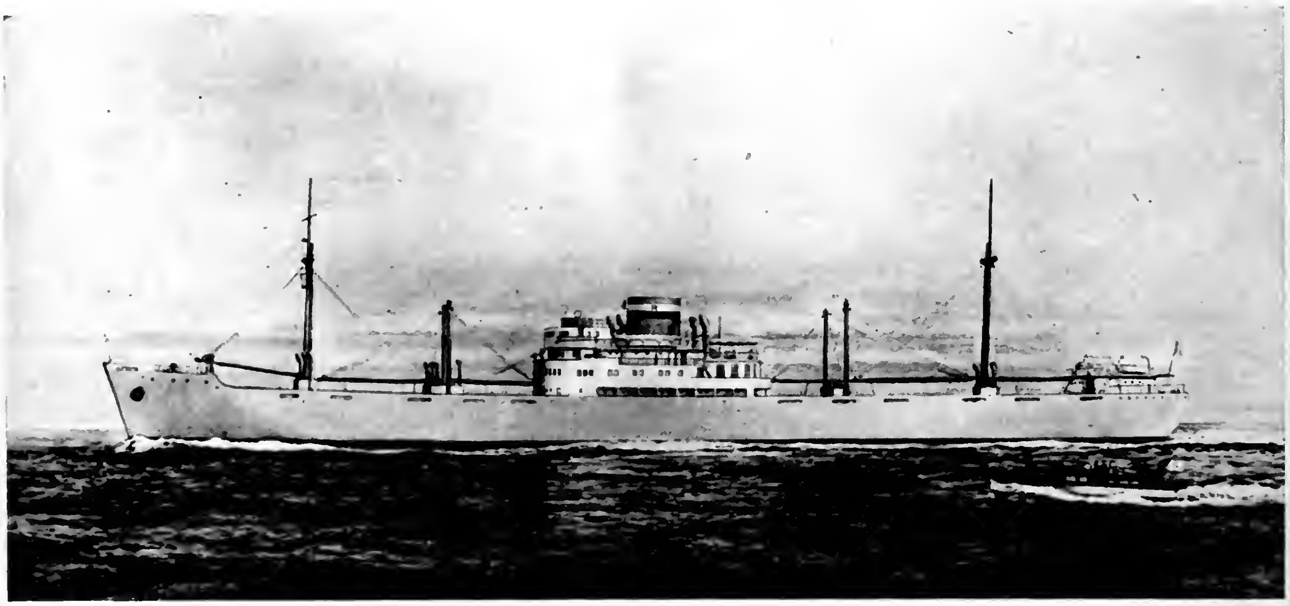
These cleaners are of the so-called "turbine" type the motors of which are either true impulse turbines or expansion-reaction in design. These motors are usually adjacent to the cutting accessory and the cleaner must thus enter the tube. Feeding is done by means of an appropriate hose which is resilient and pliable thus being

Fig. 2. Light duty tube cleaner.

able to negotiate the bends that predominate in the majority of boiler tubes. History would indicate that the water driven turbine type was first developed approximately forty years ago. At this time the use of compressed air was not a popular reality. It must be assumed that since water pumps were always available around the boiler room, water as motive power was natural. Today the air driven cleaner is the most popular and this cleaner as well as those driven by steam or water can be used for the cleaning of heat exchangers. Approximately 30% of the "turbine" type of cleaners manufactured are for use in heat exchanger cleaning. However, its use is limited to tubes that are not plugged or deposits not very thick and particularly where a substantial amount of time is available for tube cleaning. Quite often this time factor coupled with the lower investment of the standard boiler tube cleaner may be the deciding factor relative to the selection of any of the cleaners herein described. To some extent the cutting accessories are similar and there are also many cases on record where drill bits have been directly attached with successful results. When utilizing these cleaners the general practice is to eliminate auxiliary scavenging mediums as in most cases the exhausting water, air or steam is sufficient to carry away the debris. These cleaners are made for the cleaning of tubes as small as 1/2" inside diameter. For all practical purposes there are no restrictions to the upper limits and tubes up to 6" inside diameter are commonly cleaned, although not necessarily heat exchanger tubes.

New Japanese-Built Motor Ships

—They Will Be Carrier Equipped



One of the three 15,500 ton vessels being built in Japan by Mitsubishi Heavy Industries, at Nagasaki, for the Republic of the Philippines, to be operated by the De La Rama Steamship Co., Inc., of Manila.

Three of the largest cargo ships to be constructed in Japan since the war, under contract for the Republic of the Philippines, will be equipped with Carrier refrigeration machinery.

Each of the vessels will be 15,500 tons, deadweight, and 10,000 gross, and are being built by the Mitsubishi Heavy Industries at their Nagasaki Shipyard and Engine Works. Nagasaki was one of the two Japanese cities to be atom-bombed durinig the war and is now recovering rapidly. The vessels are 465′ 11″ long, 64′ 3″ beam, and 41′ draft, and are two screw diesels of 10,660 horsepower. First keel laying was April 19, 1949. The new ships will be operated by the De La Rama Steamship Co., Inc., of Manila, carrying fruits and other cargo in Pacific trade.

Contract for the construction of the three ships was arranged by the two governments concerned, under the auspices of General MacArthur's headquarters.

Four fruit chambers, two provision rooms and four frozen food chambers will be installed on each ship with the Carrier equipment, which consists, for each craft, of ten 30 h.p. compressors and accessory auxiliary equipment. The contract was handled by Oriental Carrier Engineering Co., Ltd., of Tokyo.

B & W Boilers in World's Largest Dredge

The 12,000-ton *Essayons,* the world's largest sea-going hopper dredge, which passed official dock trials October 3, will operate under steam supplied by Babcock & Wilcox boilers. Built by the Sun Shipbuilding and Drydock Company for the U. S. Army Engineers, the dredge will be assigned for use in New York Harbor late this year. The dredge was designed by the Marine Division of the Philadelphia District of the Army Engineers.

Two B & W sectional header single uptake boilers, equipped with superheaters and tubular air heaters, will deliver steam to two turbo-electric generators designed for a total of 8,000 shaft horsepower. Each boiler will be fired with six B & W wide range steam-mechanical type oil burners.

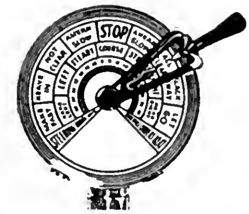
Each boiler has a working pressure of 600 psi. The superheater will deliver steam at a total temperature of 850 F. Normal steaming capacity will be 40,000 pounds per boiler per hour, the designed basic steaming capacity, 60,000 lbs., and the maximum continuous steaming capacity, 75,000 lbs.

The boilers were designed and constructed by The Babcock & Wilcox Company at its Barberton (Ohio) plant. B & W Junior firebrick for the boiler furnaces came from the company's refractories plant at Augusta, Ga.

The 525-foot vessel is expected to operate at a speed of three miles an hour while dredging against a five mile-an-hour current. Her hopper capacity will be 8,000 cubic yards and her loaded capacity 12,000 tons of sand or silt. When fully loaded the vessel will attain a speed of 15.5 miles per hour, driven by twin screws.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 500 Sansome St., San Francisco, California

Use of the Slide Rule by Deck Officers

IN A PRECEDING ARTICLE on the use of the slide rule more detailed description of its use was promised. Let's start with some time, speed, and distance problems; or we might call this procedure multiplication and division in one operation.

There are other phases of the deck officer's work in which we may employ this same operation as we shall see later.

Time, speed, and distance problems may be separated into cases for classification. We will take them up separately.

First: where speed is known and distance to go is known: to find time required

(1) Set distance to go on C 1 scale in register with 60 (minutes) on D scale

(2) Set curser at speed on C 1 scale and read time required in register at curser on D scale

EXAMPLE—SPEED 14 K., DIST. TO GO 2 Mi.

Set 2 mi. on C 1 scale in register with 60 on D scale, move curser to 14 on C 1 scale and read 8.57 min. in register on D scale.

In some instances in step 2 we will find that the speed on C 1 scale will be off the rule thus necessitating a shift of C 1 indexes. If so, set curser at C 1 index, then move slide so that other C 1 index is in register with curser, then proceed with step 2 as previously described.

EXAMPLE—SPEED 14 K., DIST. TO GO 8 Mi.

The answer is 33.23 minutes.

Second: when speed is known and time of run is known. To find distance run:

(1) Set speed on C 1 scale in register with time of run in minutes on D scale.

(2) Set curser at 60 (minutes) on D scale and read distance run in register at curser on C 1 scale.

EXAMPLE—SPEED 14 K., TIME OF RUN 46 Min.

Set 14 on C 1 scale in register with 46 on D scale, move curser to 60 on D scale and read 10.72 miles run in register on C 1 scale.

Again in some instances, as in the first case, we may find it necessary to shift the position of the C 1 indexes before proceeding with step 2.

EXAMPLE—SPEED 14 K., TIME OF RUN 25 Min.

The answer is 5.84 miles.

Third: when distance run is known and time of run is known. To find speed:

(1) Set 60 (minutes) on C 1 scale in register with distance run on D scale.

(2) Set curser at time of run in minutes on D scale and read speed in register at curser on C 1 scale.

EXAMPLE—DISTANCE RUN 2 Mi., TIME OF RUN 8 Min.

Set 60 on C 1 scale in register with 2 on D scale and move curser to 8 on D scale and read 15 on C 1 scale.

In this case also we will find that at times it is necessary to shift the position of the C 1 indexes before proceeding with step 2.

EXAMPLE—DIST. RUN 6 Mi., TIME OF RUN 27 Min.

Answer—speed is 13.3 K.

As the reader can see, these cases may all be solved by table 13 of the Useful Tables. However, the use of the rule for solutions of these cases will give valuable practice in the use of the rule so as to enable its practical use in cases where tables are not available.

INCREASE IN DRAFT

(or the depth of which a vessel may legally load over her load line when in brackish water) is a case where the same operation as we have been discussing is used, and to my knowledge there are no tables for the solution of such problems.

As an example, let us assume that it is desired to find what distance above her marks a vessel with a Fresh

Water Allowance of 5 inches may load in water of 1010 density.

The formula is:

$$\frac{\text{F.W.A.} \times (\text{Sea Dens. minus Dock Dens.})}{\text{Sea Density minus Fresh Water Density}} = \text{Increase in Draft}$$

OR:

$$\frac{\text{F.W.A.} \times (1025 - 1010)}{1025 - 1000} = \text{Increase in Draft}$$

SO:

$$\frac{5 \times 15}{25} = \text{Increase in Draft}$$

To Solve on the Slide Rule

(1) Set (Sea density minus Dock density) on C 1 scale in register with Fresh Water Allowance on D scale.

(2) Set curser at (Sea density minus Fresh Water density) on C 1 scale and read Allowable Increase in draft in register at curser on D scale.

In this problem the following settings would be made: Set 15 on C 1 scale in register with 5 on D scale, move curser to 25 on C 1 scale and read 3 inches allowable increase in draft on D scale.

Other formulae which use the A, C 1 & D scales are for finding the Breaking Stress and Safe Working Load of Manila and Wire Rope. As an example the formulae for finding the Breaking Stress of Manila is $\frac{\text{Circ.}^2}{2.5} = \text{B.S.}$; and for Safe Working Load of Manila is $\frac{\text{Circ.}^2}{2.5 \times \text{Safety Factor}} = \text{S.W.L.}$

To find the Safe Working Load of a Manila Line which is 3 inches in circumference using a Safety Factor of 5.

First: square the circumference by setting the curser at 3 on D scale and reading 9 on A scale in register at curser.

Second: multiply the safety factor (5) by 2.5 by setting 2.5 on the C 1 scale in register with 5 on the D scale and reading the product 12.5 on the D scale in register with C 1 index.

Third: divide the circumference squared (9) by the product of 2.5 times 5 (12.5) by setting the C 1 index in register with 9 on the D scale; then move the curser to 12.5 on the C 1 scale and read the Safe Working Load (.72 tons) in register at curser on D scale.

To find the Safe Working Load of a wire, one half inch in diameter with a Safety Factor of 5. The formula

$$\frac{C^2 \times 2.5}{\text{S.F.}} = \text{S.W.L.}$$

First, set pi (3.1416) on C 1 scale in register with diameter of wire (.5 inch) on D scale and read circumference squared (2.465 inches) on A scale in register with C 1 index.

Second, set 2.5 on C 1 scale in register with circumference squared (2.465) on D scale.

Third, set curser at Safety Factor (5) on C 1 scale and read safe working load (1.2325 tons) on D scale in register at curser.

Distance to Horizon

Now to find the distance to the horizon on the slide rule. This problem, as many others, can be solved by use of the Useful Tables, but this is merely another demonstration of the adaptability of the slide rule. Answers to problems solved by the following formula may be checked for accuracy in Table 8.

The Formula: 1.15 (constant) X The square root of the height of eye in feet equals the distance to the horizon in miles.

The Settings:
(1) set curser at H.E. on A scale.
(2) set (constant) 1.15 on C 1 scale in register with curser.
(3) read distance to horizon in miles on D scale in register with C 1 index.

As an example let us use 55 ft. as H.E.

First: set curser at 55 ft. on A scale.

Second: set 1.15 on C 1 scale in register at curser.

Third: move curser to C 1 index and read 8.53 miles to the horizon on D scale in register at curser.

Now let us try distance off by vertical angle or Table 9

The Formula: height of object in feet multiplied by .565 (a constant) divided by Vertical Angle in minutes equals Distance off in miles.

The Settings:
(1) set height of object in ft. on C 1 scale in register with the constant (.565) on D scale.
(2) set curser at Vertical Angle in minutes on D scale and read Distance Off in miles on C 1 scale in register at curser.

Example: Height of Object 60 ft., Vertical Angle 42′.

First: set 60 on C 1 scale in register with .565 on D scale.

Second: set curser at 42 on D scale and read .807 the distance off in miles on C 1 scale in register at curser.

Now to solve some Triangles—

In the previous article on the Slide Rule, a simple Right Angled Triangle was solved and a sketch showing the solution was given.

One of the nice things about the slide rule for navigation is that all triangles, where two sides and an angle opposite one of them are known or where two angles and a side are known, are simple. When solving this type triangle the Law of Opposites is used, with the A and S scales as was explained in the previous article.

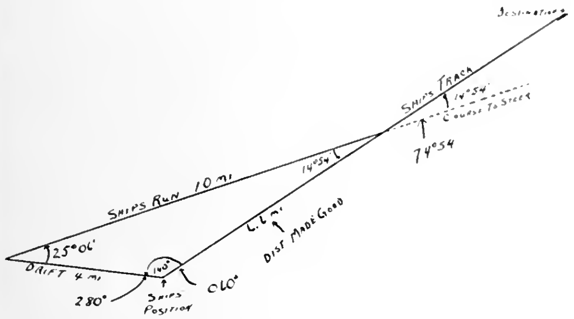
Now let us try our hand at solving an oblique triangle. Before starting, it might be well to point out that the sine of an angle is the same as the sine of its supplement. This can be verified by referring to Table 33 of Useful Tables. As an example you can see that the log sine of 60° is the same value as the log sine of 120°. We will have to keep this fact in mind as the sine scale or S scale has values tabulated only up to 90°.

Perhaps one of the best ways of explaining the solution of an oblique triangle is to use an example which will be of some practical value as well.

So let us assume that we are aboard a vessel whose destination is 12 miles distant, bearing 60° true. The current

is setting 280° true with a drift of 4 K. The vessel's speed is 10 K. Our problem is to find the required course to steer and the required time for the run.

We might first look at this problem in this manner so as to make a triangle of it. Let's assume that the vessel lay dead in the water for an hour. In such a case she would be set in a direction of 280° true (or at an angle of 140° from the direction of her destination) for a distance of 4 miles. Now let us imagine that the current stopped and the vessel steamed for 1 hour or for 10 miles in a direction that would put her back on her track at the end of the 1 hour's run, and give us a triangle as shown in the following sketch.



As is seen in the sketch we have a triangle with 140° opposite 10 miles and another side of 4 miles.

Now to solve the triangle on our Slide Rule:

First: turn the Slide over so that the S scale is up and under the A scale. Since the S scale does not go up to 140° we will have to use the supplement of 140°, or 40°. So we set 40" on the S scale in register with 10 on the A scale.

Second: set curser at 4 on A scale and read 14° 54′ on the S scale in register at the curser. This is the value of the angle opposite the 4 mi. This angle is the same as the angle between the ship's track and the ship's run extended. So by applying 14° 54′ to 60° (the direction of the ship's track) we have the required course to steer, 74° 54′. Now adding 14° 54′ to 140° and subtracting from 180° we get 25° 06′ (the value of the third angle).

Third: now moving our curser to 25° 06′ on the S scale we read the value of the side opposite this angle on the A scale 6.6 mi. or the distance the vessel would make good along the track line steering a course of 74° 54′ true.

Space does not allow going into the use of the slide rule for solving Table 7 problems, Mercator problems and others in this issue, so we will have to cover those in another article.

These articles are not intended as a complete course but merely to give the reader some examples and direction with which to begin, and as his skill improves, so also will his ability to transpose and vary the use of the device.

Port Radar Great Success at Long Beach

Although operating on an experimental basis, the Port of Long Beach Radar Control Station is proving its worth in the movement of ships into the Port of Long Beach. On Saturday, September 24, 1949, between the hours of 4:00 A.M. and 9:00 P.M., port pilots using the radar equipment under the direction of Capt. J. A. Jacobsen handled 18 ship movements in and out of the harbor.

This unparalleled operation took place following the advent of a very thick fog which set in September 23, 1949, and completely enveloped the harbor and surrounding area. During this time five ships arrived and dropped anchor off the outer breakwater and the exact location of each was ascertained by the Radar Station.

At 3:00 A.M., on September 24th, five pilots boarded the Long Beach pilot boat and were directed to these various vessels at anchor by means of radar. The first pilot was put aboard the Swedish ship *Boolongena* and the pilot boat was then given a course for the next ship, the *Permanente Silverbow*. Following this, the radar operator directed the pilot boat to the Honduran tanker *Bucross,* then to the ship *California,* and then to the freighter *Oregon* which was anchored four miles southwest of the San Pedro breakwater lighthouse. All of these ships came into the harbor through heavy fog. In this operation, bearings given by the radar station to the pilot boat were perfect and all ships were contacted "on the nose" by these bearings. The pilot boat was back at the station at 4:30 A.M., or one and one-half hours from the beginning of this operation.

At 10:00 A.M. the *Steel Seafarer* departed from Berth A-2 for sea and was assisted in making the east entrance in the breakwater by bearings from the radar station. At 11:00 A.M. the *Meredith Victory* departed from anchor to sea and was directed through the Long Beach entrance in the outer breakwater by bearings from the radar station. At 12:30 P.M. the *Kenyon Victory* got under way from anchorage and was directed along the same course. Communications between the pilot and the radar station during this time were maintained by the use of portable walkie-talkie radio equipment carried aboard ship by the port pilot.

At 2:00 P.M. the pilot station was notified that the Navy tanker *Shawnee Trail* was anchored two miles southeast of San Pedro entrance to the breakwater and also the British motor vessel *Telemachus* was anchored 6.2 miles at sea from the San Pedro lighthouse. Both ships were located by radar and the pilot put aboard by means of information from the radar station.

Following this successful operation under extremely difficult conditions, port officials were more enthused than ever before over the vast possibilities afforded by the use of shore-based radar in the navigation of ships.

(The Port of Baltimore is installing a port radar system and tests will be conducted on the installation this month. This will be the third port radar installation, the first being Liverpool and the second, Long Beach.—Ed.)

Devaluation and its Effect on American Port Traffic

By A. M. STRONG, Vice President,
American National Bank and Trust Company of Chicago

A. M. Strong

DEVALUATION of monies is not a new invention. It has been tried before by many countries during postwar periods and depressions. Outstanding, are the devaluation of the French franc 160 years ago in 1790 by the issuance of assignats, the "greenback episode" in our own country in the 1860's, and the voluntary and involuntary depreciation of European currencies after the first world war.

Originally paper money was a promise by a government to pay the holder of the bill in gold; and prior to the first world war, notes could be exchanged for gold. Today, few countries have sufficient gold reserves to cover their notes and the privilege of exchanging paper money into gold has been universally withdrawn. Even in the United States, the holder of dollar bills cannot exchange them into gold coins, notwithstanding the 24½ billion dollars in gold buried at Fort Knox and elsewhere.

International monetary values are now *artificially* maintained. The rates of monies are established by government decree and controlled by an elaborate system of laws and regulations. These laws, which are prevalent in almost every country of the world, regulate the acquisition and sale of gold, the transfer of money, payment for imports and exports, trading in securities, etc.

After the first world war even before European currencies were stabilized there was only one rate for each currency and the various monies could be freely bought and sold in the exchange markets. Since the second world war, most currencies have several rates: the official rate fixed by governments for the settlement of commercial transactions, other "official" rates fixed by governments for tourists, benevolent remittances and unofficial rates quoted on free, black or grey markets. Some of these unofficial rates are entirely legal, others are more or less officially tolerated and some are illegal. The unofficial rates are classified as compensation rates, security rates, switch rates, transferable rates,, olive oil rates, luxury rates, etc. The multiple rates for foreign monies created uncertainty and confusion in international trade. Enterprising merchants bought their goods cheaper by using

This paper was presented before the Association of Interstate Commerce Commission Practitioners, Chicago, Illinois, October 7, 1949

some special kind of exchange; transferable sterling, luxury francs, wine pesetas, etc.

Review of Events

I will review the events that led to the monetary devaluations of last month. Between 1939 and 1945, most countries concentrated their industrial activities in producing implements of war. They manufactured ships, planes, tanks, cannons, uniforms and a variety of other goods that were eventually destroyed or became obsolete. They depleted their national resources. Most of the production facilities of Europe were destroyed during the war. The remaining industries which had been converted into war-time use could not manufacture the goods needed in peacetime.

Europe needed assistance and our government made large financial contributions to the rehabilitation of affected countries. Never in the history of mankind has a nation rendered assistance to other nations on such a scale and in such a generous way. I need not review all our contributions. It is sufficient to mention the UNRRA, the International Monetary Fund, the International Bank for Reconstruction and Development, our loans and gifts to Great Britain, Turkey, Greece, China and other countries, and lastly, the Marshall Plan—a program involving 17 billion dollars in aid to 16 European nations. The program contemplates that with our aid these nations will gradually increase their production, balance their imports with exports, and by 1952, become self-sufficient. So far, there is no marked improvement in the balance of trade between the Marshall Plan nations and the United States.

In 1949, the 16 European nations receiving our aid will import from us approximately 4.6 billion dollars but will sell to us only 0.9 billion dollars, and their deficit will amount to about 3.7 billion dollars. Between 1929 and 1938, these countries supplied us with about 25% of all our imports, but between 1947 and 1949, they supplied us with only 12%.

Sales to us by leading European countries for the first half of 1949 compare as follows with their pre-war sales:

Netherlands	45.0%	Germany	25.2%
United Kingdom	48.8%	Sweden	24.0%
Italy	58.6%	France	34.5%

With the end of the European Aid Program in sight, England and the other countries came to the realization that only drastic measures can solve their dollar problem.

The lag in European exports was due in part to the high artificial exchange rates maintained by European governments. British, French, Dutch and other European manufacturers were not anxious to sell to the United States because they received less for the dollars which they were compelled to surrender to their governments than they could realize by selling their goods in their own country or in other countries in Europe. The downward adjustment in the values of currencies is a device to remedy this situation and to stimulate exports to the United States.

On September 18th the British Government reduced the value of the pound from $4.03 to $2.80. As of October 5th, twenty-nine countries had followed suit.

Country	*Old Rate Dollars for 100*	*New Rate Dollars for 100*
Argentina	$ 20.82	$ 11.11
Australia	322.75	224.25
Belgium	2.28	2.00
Burma	30.00	21.00
Canada	100.00	90.00
Ceylon	30.00	21.00
Denmark	20.90	14.50
Egypt	418.00	287.00
England	402.50	280.00
Finland	.62	.45
France	.303	.285
Germany	30.00	23.81
Greece	.010	.0066
Hongkong	24.00	17.75
Ireland	403.00	280.00
Israel	303.00	280.00
Iraq	403.00	280.00
Italy	.175	.158
India	30.23	21.15
Iceland	15.30	10.60
Jordan	$403.00	$280.00
Luxembourg	2.30	2.00
Malaya	47.00	32.50
Netherlands	37.70	26.40
New Zealand	403.00	280.00
Norway	20.15	14.10
Portugal	4.02	3.50
South Africa	403.00	280.00
Sweden	27.83	19.40
Switzerland	25.15	23.25

It is too early to appraise the full effect of the devaluation. It may be expected that American imports will increase and American exports will decrease. Many imported products will cost less abroad than they did prior to September 20th and the tariff costs which are based upon the purchasing price of the merchandise will be correspondingly reduced. American importers will be able to buy British, Australian, Irish, Indian, Dutch and Swedish goods for 30% less. Similarly the goods of other countries that have depreciated their monies will cost less in terms of American dollars. British manufacturers who received one pound for $4.00 worth of goods sold in the United States will now receive the same pound for each $2.80. Consequently exporters in these countries will be able and willing to sell in American markets.

Should prices, however, advance in those countries, the benefits of the measure will be nullified. There are already indications that certain prices have increased in Great Britain and elsewhere. The wholesale price index in England advanced last week by approximately 17%.

On the other hand, foreign buyers will have to pay more for American goods. In the case of Britain, Australia, India, Netherlands, etc., the increased cost will

(Please turn to page 96)

Japanese Recovery

JAPAN is hard at work and anxious to restore its status in the world, reported Henry E. North, president, San Francisco Chamber of Commerce, and Alvin C. Eichholz, manager, World Trade Department, on their return from Tokyo, September 30.

North and Eichholz were members of a group of American business and newspaper men on the pre-inaugural flight of Pan-American World Airways' new San Francisco-Tokyo Stratocruiser.

In trips throughout the Japanese capital during their three-day stay, the group observed outstanding progress in rehabilitation and an increasingly active industrial economy being effected.

General MacArthur reviewed objectives and accomplishments of the occupation at a luncheon for the delegation and seemed optimistic about the future.

An article on the future of Japanese shipping by Alvin Eichholz written especially for these pages follows:

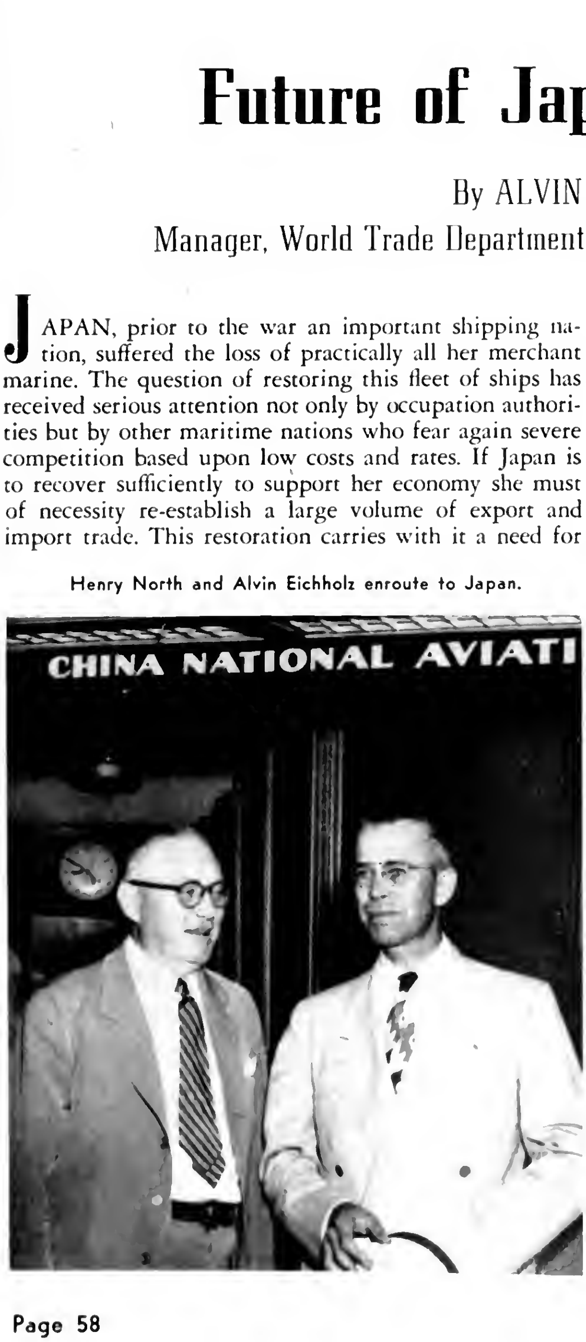
Future of Japanese Shipping

By ALVIN C. EICHHOLZ

Manager, World Trade Department, San Francisco Chamber of Commerce

JAPAN, prior to the war an important shipping nation, suffered the loss of practically all her merchant marine. The question of restoring this fleet of ships has received serious attention not only by occupation authorities but by other maritime nations who fear again severe competition based upon low costs and rates. If Japan is to recover sufficiently to support her economy she must of necessity re-establish a large volume of export and import trade. This restoration carries with it a need for a merchant marine sufficient to carry a reasonable share of her tonnage, say 50 per cent[1]. As is well known, she is dependent upon outside sources for essential raw materials and foodstuffs and currently she is bearing a dis-proportionate foreign exchange burden to pay for transportation costs. In 1939 Japan paid approximately 440 million dollars for ocean transportation of which 280 million dollars was returned by revenue from her own merchant fleet[2]. In 1948 approximately 180 million dollars was required for such transportation and less than 7 million dollars was returned through her presently reduced fleet. Although Japan at present has approximately 2,400,000 dead weight tons of merchant shipping, it is estimated that only about 200,000 tons are capable of long ocean haul and 400,000 tons capable of short ocean haul. At the outbreak of the war Japan's merchant marine totaled about 6,000,000 gross tons. (7,145,000 d.w.)

Henry North and Alvin Eichholz enroute to Japan.



If Japan's purchases in the United States are to be maintained and expanded, shipping could provide its share of foreign exchange. Exhaustive studies are currently under way to develop a practical shipping program.

The members of the Oriental inaugural flight by the double-decked clipper of Pan American World Airways found evidence of outstanding progress and rehabilitation and an increasing active industrial economy. It

Editor's Notes:

1. American maritime interests do not agree that Japan needs to carry 50 per cent, nor any, of her overseas cargo. Nor do they agree that actual ocean transportation is a vital factor in Japanese economy.
2. Offsetting income from ocean transportation is the cost of imported supplies for the ships, principally steel and coal used in construction, and fuel oil used in operations.

Yokohama Harbor today. This snapshot taken by Alvin Eichholz shows the port filled with ships. The fog obscures many more.

was apparent everywhere that this nation of 80 million people was hard at work and anxious to restore their country.

Meetings with officials of SCAP and the American Chamber of Commerce in Japan supplied the group with an outline of the Japanese recovery program and its objectives, as well as the problems still to be faced. Considerable advancement has been made in the rehabilitation of agriculture, fisheries, forests and other natural resources. The nation's public health is receiving considerable attention. New crops are being developed. Diversification of food in the diet of the Japanese is recommended to supply a protein deficiency thus contributing to a greater resistance to certain tropical diseases, and benefiting the general well-being of the people.

Japan's financial problems are tremendous. At the War's end Japan was bankrupt with a loss of practically all financial assets, overseas holdings, etc. Sources of private credit are restricted, and the Government is faced with heavy war debts. Money is tight, and in order to relieve the general exchange situation and promote foreign trade, SCAP must foster multilateral trade. Japan, also a dollar shortage area, has completed trade arrangements with soft currency countries, including the sterling area, in order to realize plans for a better balanced trade. Greater emphasis is being placed in trade through normal trade channels, thus reducing the dependence on United States appropriated funds. Present industrial production is 93% of 1930-1934 levels in spite of the fact that the output of steel, petroleum, shipbuilding and textiles are far below prewar. Concentrated effort is being made to promote "invisible exports" through the improvement of hotel and transportation facilities to accommodate large numbers of tourists.

Prewar Japanese fiscal policy was loosely formulated and directed. Adequate fiscal and budget controls as known in the United States did not exist, nor was a balanced budget a major consideration of national policy. The Japanese Government was required to live within a balanced budget and careful scrutiny was exercised over the preparation thereof. It has been possible to reduce overall deficit financing from 52% during Japanese fiscal year 1946-1947 to about 10% in Japanese fiscal year 1948-1949.

Last fall SCAP enunciated three principles to effect stabilization of prices and wages and relieve domestic political pressures for increased deficit financing and subsidies, viz: no additional subsidies; no deficit financing; and, no price increases would be allowed simply to meet wage demands.

Efforts to accomplish a balanced budget provide for a counterpart fund to be used by the Japanese Government to reduce the national debt, for long range investments in railroads and communications, and for loans to private industry.

Recommendations of the Shoup tax mission recently announced call for a complete revision of tax assessment and collection methods. Among other things provision is made for payment in foreign currency of Japanese taxes by foreign businessmen on their earnings. American businessmen believe this would be disastrous to foreign firms in Japan.

Members of the group observed that the occupation authorities are doing a good job; there appears to be no resentment on the part of the people and they welcome their new freedom. From information made available there appears to be no menace from communistic activities and it will be no threat so long as economic and financial conditions continue favorable.

The delegation attended a luncheon given by General MacArthur at which he reviewed the objectives and accomplishments of the occupation. In general, he was optimistic concerning the future.

New List of Foreign Freight Forwarders

The Maritime Commission's September 1 list of registered foreign freight forwarders shows the following in the Pacific Coast area:

Previous lists are no longer valid. Forwarders whose applications were not received in sufficient time for inclusion in this present list, as well as those on whom reports have not been received from the Department of Commerce, will, when cleared by that department, be included in future lists.

LOS ANGELES, CALIFORNIA

A. E. Coppersmith, 124 West 4th Street (13)
Air Express International Agency, Inc., 5691 Avino Drive (Br. of N. Y.)
Air-Sea Forwarders, 406 South Main Street (13)
American Overseas Forwarding Co., 354 So. Spring St. (13) (Br. of N. Y.)
Best Forwarding Service, 124 West Fourth Street (13)
Carmichael Forwarding Company, 406 South Main Street (13)
Castelazo & Associates, 408 South Spring Street (13)
Edward S. Zerwekh Company, 354 South Spring Street (13)
Frank P. Dow Co. of Los Angeles, 354 South Spring Street (13)
Hawaiian Freight Forwarders, Ltd., 354 So. Spring St. (13) (Br. of N. Y.)
H. S. Dorf & Co., Inc., 354 So. Spring St. (13) (Br. of N. Y.)
James Loudon & Co., Inc., 354 South Spring Street (13)
John J. Moylan, 354 South Spring Street (13)
John L. Westland & Son, Inc., 354 South Spring Street (13)
Judson-Sheldon Div.-Nat'l. Carloading Corp., 354 So. Spring Street (13) (Br. of N. Y.)
Loretz & Company, 108 West Sixth Street (14)
Manufacturers' Export Organization, Inc., 1801 S. Olive Street (15)
Mattoon & Company, Inc., 354 So. Spring Street (13) (Br. of S. F.)
M. G. Otero Company, 354 South Spring Street (13)
Pacific & Atlantic Shippers' Ass'n., Inc., 2001 Hunter St. (Br. of Chicago)
Perryman, Mojonier Company, 354 So. Spring Street (13)
Stanley Lindo & Company, 406 So. Main Street (13)
Surface Freight Corp., 5691 Avion Drive (Br. of N. Y.)
Universal Transcontinental Corp., 542 South Broadway (Br. of N. Y.)
W. J. Byrnes & Co. of Los Angeles, Inc., 354 So. Spring Street (13)

OAKLAND, CALIFORNIA

G. Hardt Company, 301-307 Seventh Street (7)
Pacific & Atlantic Shippers' Ass'n., Inc., 200 Third Avenue (Br. of Chicago)

PORTLAND, OREGON

Frank P. Dow Co., Inc., 608 U. S. National Bank Bldg. (4)
Geo. S. Bush & Co., Inc., 211-213 Board of Trade Bldg.
Griffith Transport Company, 1111 Equitable Bldg. (4)
I. Frazier Company, 3630 N. W. Front Avenue (Br. of Seattle, Wash.)
Pacific & Atlantic Shippers' Ass'n., Inc., 1605 S. E. Water St. (Br. of Chicago)
Pacific World Shipping Company, 3630 N. W. Front Street
Page Brothers, 222, 224, 226 Board of Trade Bldg. (4)
Powell Shipping Company, 801 Dekim Building
Seaport Shipping Company (Portland), 512 Lewis Bldg. (4)
The Wilcox-Hayes Company, 1202 Wilcox Building

SACRAMENTO, CALIF..

Bishop & Bahler, Native Son's Bldg. (Br. of San Francisco)
Pacific & Atlantic Shippers' Ass'n, Inc., 520 9th Street (Br. of Chicago)

SAN FRANCISCO, CALIF.

Air Express International Agency, Inc., 225 Steuart Street (Br. of N. Y.)
American Express Company, 253 Post Street (Br. of New York)
American Overseas Forwarding Co., 420 Market Street (Br. of N. Y.)
Berry & McCarthy, 260 California Street (11)
Bishop & Bahler, 717 Market Street (3)
Dyson Shipping Company, Inc., 311 California Street (Br. of N. Y.)
Frank P. Dow Co., Inc., 460 Battery Street (11)
Green, Scott & Co., Inc., 500 Battery Street (11)
Harper, Robinson & Co., 510 Battery Street (26)
Hawaiian Freight Forwarders, Ltd., 420 Market Street (Br. of N. Y.)
Henry Wilson Farrell, 240 Battery Street (11)
Hoyt, Shepston & Sciaroni, 430 Sansome Street (11)
H. S. Dorf & Co., 510 Battery Street (11)
Inter-Maritime Forwarding Co., Inc., 510 Battery Street (11) (Br. of N. Y.)
J. E. Lowden, 465 California Street (4)
John L. Westland & Son, Inc., 409 Washington Street (Br. of L. A.)
Judson-Sheldon Div.—Nat'l Carloading Corp., 55 New Montgomery Street (Br. of N. Y.)
Mattoon & Company, Inc., 516 Battery Street (11)
Pacific & Atlantic Shippers' Ass'n, Inc., 240 Battery Street (11) (Br. of Chicago)
Surface Freight Corp., 225 Steuart Street (Br. of N. Y.)
Thornley & Pitt, 520 Battery Street (26)
Universal Transcontinental Corp., 420 Market Street (Br. of N. Y.)

W. J. Byrnes & Company, 409 Washington Street

SAN PEDRO, CALIF.

James Loudon & Co., Inc., 112 W. Seventh Street (Br. of L. A.)

SALT LAKE CITY, UTAH

Pacific & Atlantic Shippers' Ass'n, Inc., 117 E. First South Street (Br. of Chicago)

SEATTLE, WASHINGTON

Alfred H. Marzolf, 560 Olympic National Bldg., 814 2d Ave. (4)

B. R. Anderson & Co., 314-19 Colman Bldg. (4)

Frank P. Dow Co., Inc., 1261 Olympic National Bldg. (4)

Geo. S. Bush & Co., Inc., 258-262 Colman Bldg.

I. Frazier Company, Exchange Bldg. (4)

Judson-Sheldon Div.—National Carloading Corp. 75 Massachusetts Street (Br. of N. Y.)

Norman G. Jensen, Inc., Smith Tower (4) (Br. of Minneapolis)

Pacific & Atlantic Shippers' Ass'n., Inc., 801 1st Avenue S. (Br. of Chicago)

Paul A. Umoff, 1923 26th Ave., North

Robert E. Landweer, 83-85 Marion St. Viaduct (4)

Seaport Shipping Co. (Seattle), 418 New World Life Bldg. (4)

W. J. Byrnes and Company, Inc., 6644 White Bldg. (1)

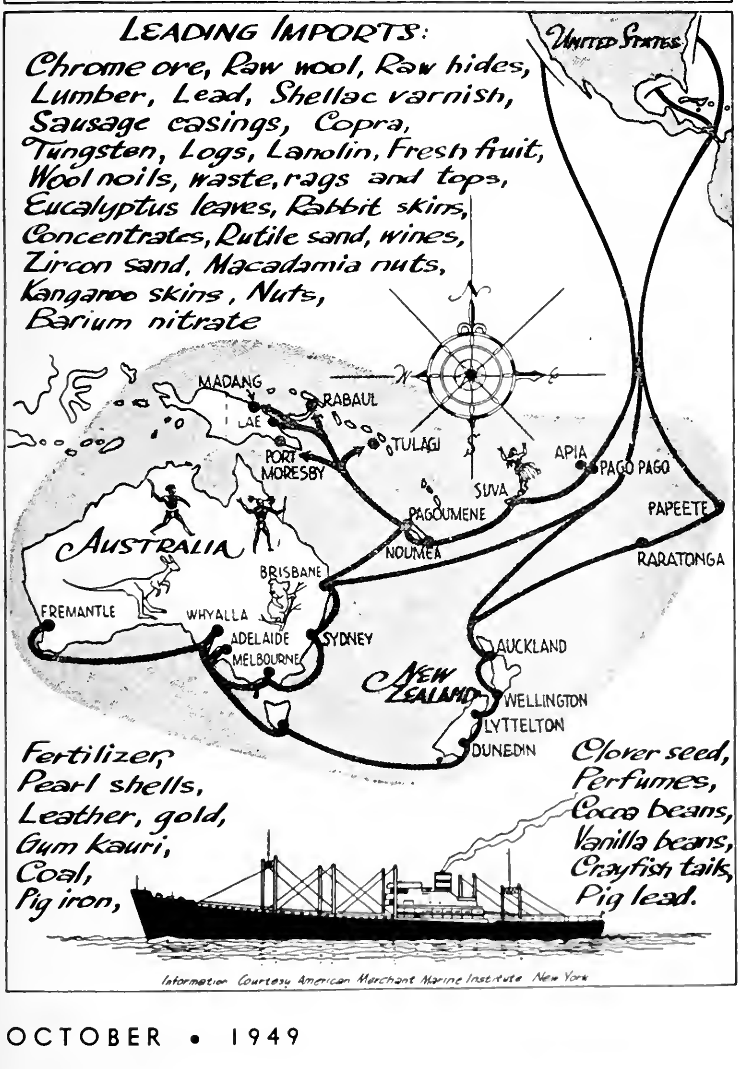
SPOKANE, WASHINGTON

Pacific & Atlantic Shippers' Assn., Inc., East 41 Gray Avenue (Br. of Chicago)

TACOMA, WASHINGTON

B. R. Anderson & Co., 614-16 Puget Sound Bank Bldg. (2) (Br. of Seattle)

WHAT THE SOUTH PACIFIC SENDS US



Holman Heads Foreign Trade Convention

Eugene Holman, president of Standard Oil Company (New Jersey), has accepted the chairmanship of the New York Convention Committee of the Thirty-sixth National Foreign Trade Convention to be held October 31-November 2 at the Waldorf-Astoria, New York.

Japanese "American Fair" Scheduled Next Year

Plans for a 1950 American Fair to be held in Japan have been outlined in a letter recently received by the San Francisco Chamber of Commerce from the president of Kei-Han-Shin Electric Railway Company, Inc., Osaka, Japan.

Officials of the Japanese Railway recently visited San Francisco and discussed preparations for the fair with Chamber officials. Since then, they have submitted their report to the Osaka Chamber of Commerce.

The fair is scheduled to be held from March 20 to May 31 at Nishinomiya Stadium, between Osaka and Kobe. It will feature various branches of history, politics, economy, culture, industry, and "citizenship of the United States."

Pacific WORLD TRADE

Los Angeles Foreign Trade Zone Dedicated

Executives representing every phase of transportation —steamship, railroad, motor truck and air—joined with Secretary of Commerce Charles Sawyer and Mayor Fletcher Bowron of Los Angeles, to formally dedicate Foreign Trade Zone No. 4 at Los Angeles Harbor September 14. 350 foreign traders and business executives watched colorful ceremonies while Secretary Sawyer, who is also chairman of the Foreign Trade Zones Board, Washington, D. C., and Mayor Bowron, put on welder's gloves and goggles, and completed the final link in the 10-foot high wire fence enclosing the five-acre zone.

The trade zone is adjacent to Berth 60, San Pedro district, and utilizes part of the $1,500,000 Municipal warehouse that fronts on Outer Harbor. In the Zone are transit sheds and rooms of the warehouse where imported goods can be inspected, processed, blended, packaged, relabeled and manipulated for foreign transshipment without payment of import duty or the operations may be completed before goods enter Custom's territory and payment of U. S. duty.

Secretary Sawyer made the dedicatory address. Other speakers on the program included: James Ingebretsen, president of the Los Angeles Harbor Commission; Earle V. Grover, president of the Los Angeles County Chamber of Commerce, and chairman of the day; Philip Stein, president of the Foreign Trade Association of Southern California; Gaylord Allen, assistant traffic manager of the Union Pacific Railroad; J. B. Banning, Jr., president of the Los Angeles Steamship Association; George Cussen, executive vice president of the Flying Tiger Lines; Russell Williams, assistant collector of Customs; Al Pearson, president of the Southern California Motor Truck Association and Congressman Gordon McDonnough.

According to Harbor Department estimates, the cost of operating the zone the first year will approximate $70,000. The Crescent Wharf and Warehouse Company will operate the Zone under contract with the Harbor Department.

Top: World Trade Link Welded—Secretary of Commerce Charles Sawyer, left, and Mayor Fletcher Bowron, Los Angeles, complete final weld of fence enclosing Foreign Trade Zone No. 4, during dedication ceremonies in Los Angeles Harbor September 14.

Bottom: Part of crowd of 350 world traders, transportation executives and speakers, shown at dedication ceremonies for Los Angeles Harbor Foreign Trade Zone, September 14. Speaker at microphone is President Earle Grover of Los Angeles County Chamber of Commerce who was chairman of the day.

Seattle Trade Zone Importance Recognized By Officials

Governor Arthur B. Langlie acted as master of ceremonies when Secretary of Commerce Charles Sawyer formally dedicated the Port of Seattle's new Foreign Trade Zone on September 22 at the East Waterway Terminal.

Mayors William F. Devin of Seattle, Arthur Meehan

of Spokane, and Val. C. Fawcett of Tacoma attended the ceremonies as representatives of their respective cities, and Washington's congressional delegation was represented by Congressman Hugh B. Mitchell, Henry M. Jackson, and Thor C. Tollefson.

Representing the Port of Seattle Commission was J. A. Earley, president; E. H. Savage, vice-president, Adm. Gordon Rowe, secretary, and Col. Warren D. Lamport, General Manager.

State representatives on the speakers' platform included John L. O'Brien, Edward F. Riley and R. Mort Frayn, Senator Clinton S. Harley was also present.

One honored guest who watched the dedication of the Foreign Trade Zone with special interest was Scott Calhoun, who as City Corporation Counsel in 1907, drafted the laws first forming the Port of Seattle district. Calhoun personally carried the laws to the state legislature in that same year, where they were rejected. The same thing happened again in 1909, but finally in 1911 the legislation was passed. Since that time, Calhoun has watched with pride the tremendous growth of the Port of Seattle, and sees in the new Foreign Trade Zone, the natural culmination of the ever-important part the City of Seattle and the Pacific Northwest is playing in world commerce.

Note: Pictures of Seattle and Los Angeles Foreign Trade Zones appeared in recent issues of *Pacific Marine Review*.

Trade Mark Rights in Japan

During recent months, the Department of Commerce has received numerous inquiries concerning trade mark rights in Japan. These inquiries have related not only to rights existing in Japan at the beginning of the war in 1941 but to acquisition of rights since the termination of hostilities.

In response to such inquiries, the Far Eastern Commission has now established a policy respecting trade marks, trade names and marking of merchandise in Japan and presented it to SCAP for implementation. Copies of the official release explaining in detail the new policy decision may be obtained gratis at District Offices of the Department.

Pacific WORLD TRADE

Items Ineligible for Financing by ECA

ECA has established the following list of items as being ineligible for ECA financing:

1. Automobiles, assembled convertibles regardless of value, and other assembled automobiles with an F. A. S. value of $3,000 or more;
2. Automible radios;
3. Beverages;
4. Cameras and equipment, including film;
5. Clothing;
6. Confections;
7. Household equipment: furniture, kitchenware, metalware, glassware, ranges, refrigerators, deep freezers, vases, vacuum cleaners, washing machines, radios, other appliances;
8. Jewelry, precious metals and stones;
9. Laces, draperies and related items;
10. Musical instruments;
11. Personal accessories;
12. Sporting goods;
13. Toilet preparations (except basic materials);
14. Toys.

Upon certain conditions specific purchases of cameras and clothing may become eligible by being specifically authorized in a procurement authorization.

Repair and replacement parts for items 1, 2, 4, 7 and 10 above are eligible for financing.

The release of this list does not indicate that all unlisted items are acceptable.

Insurance on Tuna Clippers

Because the fishing industry has many variables not found in other maritime operations, the problems related to insuring the boats have brought wider discussion than most types of marine insurance. In the case of tuna boats, the long voyages, the tendency toward overloading or unbalanced loading, and the limited classification by the American Bureau of Shipping, together with the lack of intimate knowledge of their vessels by the operators, all increase the importance of discussion by those who take the risk of insuring the boats.

Following a recent talk on many phases of tuna boat construction and operation by James F. Petrich, reported in this and other issues of the *Pacific Marine Review,* certain members of the Society of Naval Architects and Marine Engineers were invited to make formal comments. One of these was G. C. Snyder, naval architect of Seattle. His comments deal with the insurance problem, and are quoted here.

Discussion of the James F. Petrich Paper "The Tuna Clipper"

By G. C. Snyder

THIS paper is most interesting in that it excellently conveys the "Atmosphere" surrounding the design and construction of a modern tuna clipper in a typical yard specializing in this type of vessel. The portion I have singled out for discussion is that part dealing with stability and the method of conducting the inclining experiments.

Stability is still the characteristic in which these vessels depart the most from the conventional—in which, if they do not break all the rules and previous conceptions, they at least bend them badly. The situation has improved in the past few years, but still leaves much to be desired.

In the burst of clipper construction which occurred immediately after the war, a number of horrible examples were produced. Many war-born yards sought to extend their life by building vessels to satisfy the then great demand for tuna clippers, without previous experience or adequate technical counsel. At the same time, the swing to steel was pronounced, and the tendency to construct the current vessel by "rule-of-thumb" proportions based on previous ones, which were of wood, also produced many failures. The combination of the two factors was the cause of many gray hairs in the insurance business at that time. However, the situation is levelling off—as all things do in time. The *war-born* yards are mostly out of the picture now. A number of them foundered all the more quickly and disastrously because of their ventures into clipper building. The yards which have continued to build steel clippers by now have realized the differences between the weights and carrying capacities of wood and steel vessels and are taking them into account in their designs. Perhaps the current design is based on the last *steel* vessel instead of the last wooden one.

The marine insurance industry has made limited progress in integrating itself in such a way as to properly administer the supervision of fishing vessels so as to minimize the risk. Efforts have been made, but due to the competitive nature of the business it has proven impossible thus far to establish standards and judge all vessels by those standards. For the same reason it has not proven possible yet to undertake the research and investigation work necessary to arrive at such standards: there is no one to foot the bill. Hence tuna clippers are still being tested for stability by a number of individuals, who are relying on different interpretations of the stand-

ards accepted for conventional types of vessels, as they believe they apply to clippers. It is not surprising, then, that an owner, in failing to get his vessel passed and hence insured by one company, may sometimes be successful in taking it elsewhere and having it covered.

Some qualified men put their faith in statical stability curves, calculated by the usual methods from body plans, to indicate the range of positive righting moments. The writer has little faith in this method for the following reasons:

(1) Initial trim is usually neglected in such calculations, and is usually considerable in tuna vessels in operating condition.

(2) Trim while heeling is always neglected, and with the conventional raised forecastle assumed intact, which causes great trim by the stern as the after deck goes under the water, completely erroneous results may be obtained.

(3) The effect of free surface is not usually taken into account, which in a tuna vessel is so great as to make such calculations completely in error. Add to this the probability of spilling water from full wells and bait boxes with open hatches at large angles of heel, and it is likely that completely erroneous conclusions may be drawn from the results of such calculations.

The writer has seen statical curves made indicating positive stability to over 75° with initial freeboards of less than six inches and is certain that this result is completely at variance with the actual stability range of the vessel for the above reasons.

The human element is the one that gives the stability expert the greatest concern. Mr. Patrich has made reference to written instructions and limitations sometimes being put aboard. The fishermen are not noted for their good judgment in the handling of their vessels, and it has become the practice to post instructions as to loading which will assist them to keep out of trouble. However, the requirements of the service and the design of the vessels is such as to make the possible combinations of loading so numerous that the instructions cannot be very specific and must be elementary in nature. The crew is therefore faced with the necessity of making day to day decisions regarding changes in the loading of their vessel, with often a minimum of understanding of the effect on stability, and only general instructions to guide them: and this in a vessel which is basically sub-standard or deficient in stability to begin with!

The insurance representative deplores the unknown quantity of the human element in appraising the risk, but there is little he can do about it. He has sometimes resorted to some high-pressure on-the-spot training for the benefit of the vessel's personnel—but who knows what crew may take the vessel on her second voyage?

There never was a foolproof clipper; on the other hand, there probably never was one so deficient in stability but that the most careful, expert handling would bring her back from the fishing grounds afloat and right side up. The problem is, at what point between these two extremes does the knowledge and judgment of the crew balance the characteristics of the vessel?

At some point a line must be drawn, on one side of which will be grouped those vessels which show characteristics providing safety with proper handling and even allowing for a few minor mistakes in judgment; these vessels will be recommended for insurance. On the other side of the line will be grouped those vessels which do not appear to have sufficient reserve of stability to allow for the expected number of blunders; these are rejected and must be altered to improve the chances. It is a difficult line to draw, and places the technical man in an uncomfortable position for a "yes" or "no" answer to the insurance company's blunt question, "It it safe"?

Most losses attributed to deficient stability have actually been founderings due to overloading. Many a clipper has been said to have capsized because she rolled over in the process of going down. It is not to be expected that stability is to be provided in any vessel to insure that it will sink right side up. The greatest potential danger in the tuna clipper is not reducing of the metacentric height to an unsafe value, but of overloading. This is the principal reason for conducting multiple inclining experiments as described in the paper, which permits visual evidence and easy measurement of freeboard in loaded conditions, with practically no possibility of error. The writer knows of no better way of convincing the captain and crew, who are always on hand, that the boat is too "heavy" than to get them to wade through ten inches of water on deck. They have to see it: they will never believe mere figures.

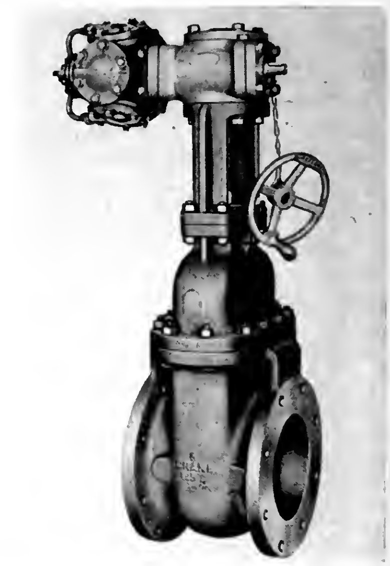
Port Engineers

Crane Valves Featured at San Francisco Society Meeting

The September meeting of the Society of Port Engineers, San Francisco, was devoted to a discussion of marine valves. The meeting was presided over by past president Phil Thearle. He introduced W. P. Toepke and Ralph L. Kreiss of the Crane Company's San Francisco office who threw on the screen many pictures of Crane's marine products form their new catalogue No. 49. "Life Lines of Industry" was the title of their series of technical pictures wherein a special showing was made of the new Fluid-Motor Operator.

Top: P. H. Thearle, presiding, and W. P. Toepke, speaker. Bottom: R. H. Sample, Matson, and R. L. Kreiss, Crane Co.

Following the meeting, the Fluid-Motor Operator connected to a 10″ gate valve was demonstrated on a display trailer in a nearby parking lot and the audience was treated to a showing of the device in operation. This machine, announced in a news item in the September *Pacific Marine Review,* appears in an accompanying cut and also in the picture of the demonstration trailer. The Fluid-Motor Operator makes possible the extensive use of motor operated valves, since the actuating unit can be easily adapted to standard valves or to



Crane Fluid-Motor Operator attached to a valve.

At the San Francisco meeting—left to right: T. Douglas MacMullen, Pacific Marine Review; Bill Sizemore, U.S.A.T.; Jack Harris, U.S.A.T.; Andy Disher, U.S.A.T.; Karl M. Kuhn, U.S.A.T.; R. E. Duffy, Frank Groves Co.; Elmer Welcher, Joseph Gisler Co.; C. H. Sandal, Westinghouse; A. R. Robertson, Westinghouse; J. V. Barker, Moore Dry Dock.

The Crane Fluid-Motor Operator mounted on a display truck, and being explained by W. P. Toepke.

valves already installed. This has heretofore been a virtual impossibility, for motor-operated valves have customarily been made up on special order to the requirements of the installation.

When the valve gate reaches the end of its travel in either direction, the motor merely stalls, still under pressure. There can be no leakage, and shut-off devices are unnecessary.

The valves can be operated by a wide range of liquids or gases at pressures from 40 to 300 psi. The operating mechanism delivers a high starting torque and is adjusted to deliver a greater torque for unseating the valve than for seating it. A handwheel is furnised for manual operation in the event of pressure failure.

Valves equipped with the new fluid-motor operator are available in most types of Crane iron-body gate valves in sizes 4-inch through 30-inch. Development is in progress on a motor for valves of still larger size.

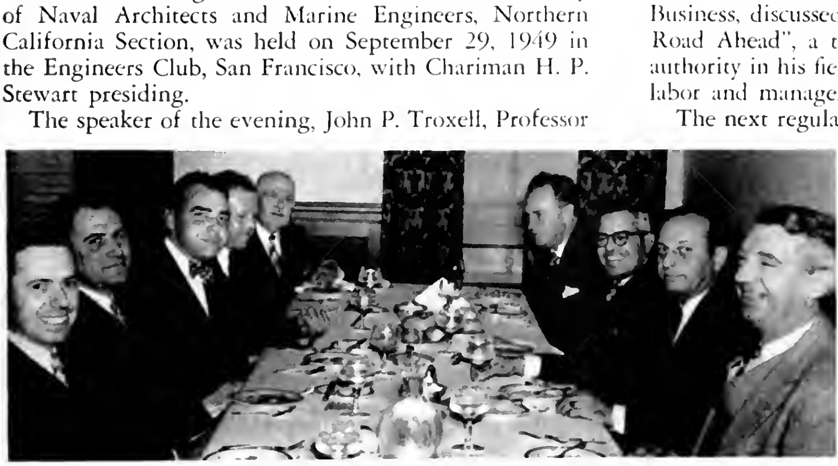
Naval Architects and Marine Engineers

Northern California Section

The first meeting of the 1949-50 series of The Society of Naval Architects and Marine Engineers, Northern California Section, was held on September 29, 1949 in the Engineers Club, San Francisco, with Chariman H. P. Stewart presiding.

The speaker of the evening, John P. Troxell, Professor of Industrial Relations, Stanford Graduate School of Business, discussed "Industrial Relations, 1949—and the Road Ahead", a timely subject. Professor Troxell is an authority in his field, having had wide experience in both labor and management circles.

The next regular meeting will be held on Wednesday,



NORTHERN CALIFORNIA SECTION, N.A.M.E.

Left side, front to back: Harold Ramsden, Todd's; Lt. Comdr. Robert Rourke, Mare Island; Philip Spaulding, Todd's; George Childs, San Francisco Naval Shipyard; C. J. Nolan, Todd's.

Right side, front to back: Austin Shean, Philip Lemler, Henry Sirgo and Harold Sylvester, all of Todd's.

AT THE NORTHERN CALIFORNIA N.A.M.E. MEETING (SEPTEMBER 29), SPEAKERS TABLE
Left to right: George Crow, Executive Committeeman; Morris Weitzner, former Chairman; William Warren, former Chairman; Sewell Knapp, Vice Chairman of Section; Harvard P. Stewart, Chairman of Section; Prof. John P. Troxell of Stanford University, speaker of the evening; John Dodds, who introduced the speaker; William Baker, secretary.

Right: Carl J. Lamb and James F. Crough at the Sept. 29 meeting of the Society of Naval Architects and Marine Engineers, San Francisco. Lamb is Consulting Engineer for the Hydraulic Press Manufacturing Co. for whom Crough has been appointed Pacific Coast representative. Crough also represents Lidgerwood Manufacturing Co.

November 30, when Professor Morelli of the California Institute of Technology will present a paper on propeller design. Subsequent meetings will be devoted to electrical distribution on shipboard by R. A. Beckman of General Electric, modern tank towing by Hugh McDonald of Stevens Institute, and three meetings devoted to students, marine insurance and admiralty law.

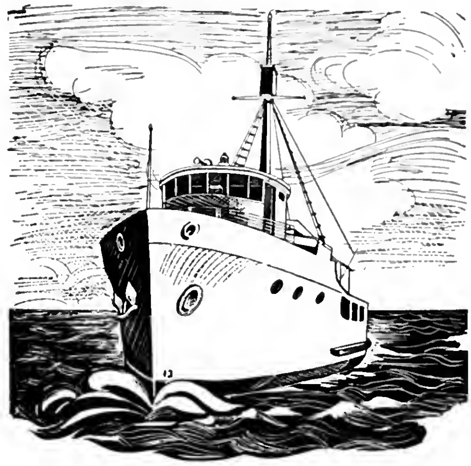
Lambie Speaker at Southern California Section

The Southern California Section of The Society of Naval Architects and Marine Engineers held its regular dinner meeting September 20 at The Persian Room, Wilmington, where a paper was read to a crowded after-dinner session by William Lambie, renowned propeller expert, entitled, "Singing Propellers—Some Causes and Effects." The paper appears in part on page 35 of this issue, with the concluding part to follow in November.

Officers of the Southern California Section are: Chairman—Thomas B. Forster, President, Forster Shipbuilding Company, Terminal Island; Vice-Chairman—James G. Craig, President, Craig Shipbuilding Company, Long Beach; Secretary-Treasurer—Bert L. Hale, Vice President-Manager, Marsol Corp., Wilmington; Executive Committee Member (3 year term)—Carleton G. Reed, Port Engineer, Richfield Oil Company, Long Beach, Calif.

GATHERED TO HEAR LAMBIE ON "SINGING PROPELLERS"

Coast Commercial Craft



Big New Barge For Freese Company

The 142nd hull constructed by Pacific Coast Engineering Company, a 195 ft. petroleum barge, for J. C. Freese Company, was launched September 27.

The principal dimensions of the barge are 195'-0" in length, beam 40'-0", depth 'midships 10'-6". The barge is being built in accordance with the regulations of the Coast Guard for carrying Grade B and lower petroleum products. The hull is divided into ten cargo tanks, five on each side of a continuous longitudinal bulkhead. Total capacity of the vessel is 11,400 barrels. This barge is of the conventional type, similar to those built in the past for the same customer, having a void forespeak tank, ten cargo tanks and a pump and engine room aft. The barge is equipped with two Gray Marine Diesel Engines, Model 6, developing 165 H.P. at 1800 R.P.M. Each engine drives a Waterous Cargo Pump, Model P-1493 having a capacity of 1050 GPM at 125 p.s.i. Engine and pump are connected with a jack shaft which

Barge #10 for J. C. Freese Co.

Charles L. Crary, San Francisco Towing Co., and Donald C. Faber, naval architect at Pacific Coast Engineering Co.

Left to right: Henry R. Kage, San Francisco Towing Co.; Mrs. Ruth F. Conway; Mrs. Charles L. Crary; Charles L. Crary, San Francisco Towing Co. and Manager of J. C. Freese Co.

passes through the oil tight bulkhead between pump and engine room. Fabco couplings are used to complete the installation.

A one-story deck house, housing quarters for a crew of two men, complete with galley and sanitary facilities, access to the pump and engine rooms, and storage for bottled cooking gas, is erected on the after end of the vessel. The barge is of the raised trunk type and is equipped with five large expansion trunks, fitted to the top of the trunk. Cargo valve hand wheels equipped with indicators, Morrison pressure vacuum relief valves, Paceco gauge hatches and Paceco manholes are mounted on the expansion trunks. The barge is equipped with an 8" suction line to the pumps, and all valves on this line are Lunkenheimer rising stem type. The discharge lines are equipped throughout with Nordstrom plug type valves. The vessel is equipped with two 4" auxiliary filling lines and the piping arrangement is such that four different products may be loaded simultaneously.

The barge, which will be known as J. C. Freese Company Barge #10, will be assigned load lines for both coastwise and special service duty by the American Bureau of Shipping.

Electrical Work

Ets-Hokin & Galvan had full charge of installing the electrical equipment. This included the building of the switchboard and installation of all wiring, and also the furnishing of an Exide Storage Battery, the generator, CO_2 fire equipment, Pyrene foam engine, and Lovell Dressel marine fittings.

The "Catalyst" Embarks on New Career

The *Catalyst,* veteran motorship of the Pacific Northwest, has recently undergone extensive structural rearrangement and is now a combined cargo and passenger vessel. It will operate between Hyder, Alaska and Puget Sound ports under the ownership of the J. H. Scott Company of San Francisco, owning operators of the Riverside tungsten and lead mine near Hyder. Miscellaneous supplies, fuel and mining personnel will be transported on the voyages north.

Described in the October 1932 *Pacific Marine Review* as "The Big Little Motorship", the *Catalyst* was built at Seattle from plans prepared by Rowlands and Strickland, naval architects, for the oceanographic department of the University of Washington. It was used in oceanographic research in Puget Sound and the north Pacific Ocean until 1942 and was then sold to the Coast Guard and used in patrol work in Alaskan waters throughout the remainder of the war.

Recent conversion work on the *Catalyst* was performed by the Puget Sound Marina, of Seattle, as successful bidder. The conversion plans and specifications were prepared by Frank E. Strickland, Seattle naval architect, one of the architects on the original design, to meet the requirements of the owner. Major conversion work consisted of installation of two cargo holds in place of existing staterooms; extension of the main deckhouse forward to allow for larger and newly placed galley; and raising the pilot house to the boat deck level, as well as raising smokestack. The original Washington Diesel engine has been overhauled by the Washington Iron Works of Seattle.

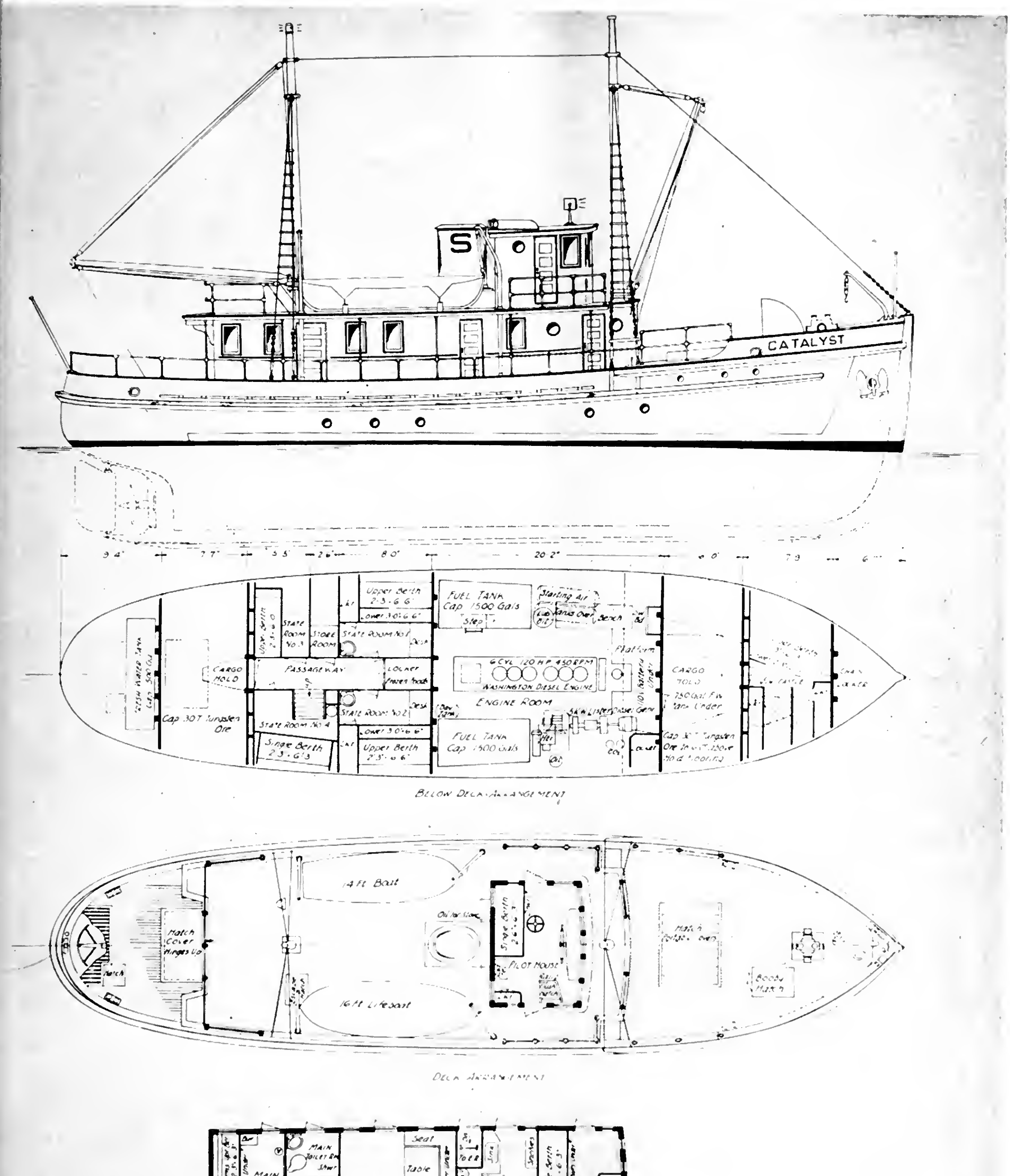
The revised *Catalyst* has accommodations for eleven passengers, in addition to captain and two crew members. The ore capacity of the holds is sixty tons which are equally distributed in both holds. The fuel capacity is 3000 gals. and fresh water capacity is 1250 gallons.

Further information is available from the plans accompanying this article.

Outboard profile and deck arrangement of the M. S. "Catalyst" after conversion.

Principal Dimensions

Length Overall	74' 7"
Beam	18' 4"
Draft (no cargo)	8' 8"
Max. Cap. Tungsten Ore	60 tons


CATALYST
FUEL TANK
Cap. 1500 Gals
Upper Berth
Lower
State Room No. 1
State Room No. 2
State Room No. 3
State Room No. 4
Store Room
Passageway
Locker
Cargo Hold
Cap 30 T Tungsten Ore
6 CYL 120 HP 450 RPM
Washington Diesel Engine
Engine Room
Platform
Single Berth
BELOW DECK ARRANGEMENT
14 Ft Boat
16 Ft Lifeboat
Single Berth
Pilot House
Hatch Cover Hinges Up
Booby Hatch
DECK ARRANGEMENT
Main State Room
Main Toilet Rm
Main Cabin
Seat
Table
Daveno
Galley
Stove
Single Berth
State Room
Locker
DECKHOUSE ARRANGEMENT
Y.S. CATALYST CONVERSION

Pacific MARINE REVIEW

News Flashes

THE MARIPOSA

The Maritime Commission's plan for completing Matson's MARIPOSA involves the payment to Oceanic Steamship Company of $5,653,555.99 and the withdrawal of subsidies on the MONTEREY. The MARIPOSA, conversion of which is 60% complete, will be required to resume service to Australia and New Zealand. The future status of the MONTEREY is not disclosed.

* * * * *

NEW SHIPS FOR PACIFIC FAR EAST?

The Pacific Far East Line, San Francisco, which has been planning replacement of chartered ships, has applied for an operating subsidy to the Orient and may be required, under the subsidy contract, to build six ships, presumably on prototype plans.

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"LURLINE" TO BETHLEHEM

Matson's liner LURLINE returns from strike-bound Honolulu and goes on drydock at Bethlehem San Francisco for bottom cleaning and painting and for inspection of tail shaft.

* * * * *

SALE TO JAPANESE SHIPYARDS

American manufacturers of marine equipment should check with the Japanese Shipyards as listed in the September Pacific Marine Review for the inclusion of American-built machinery and other equipment. Some manufacturers are doing well.

* * * * *

LAY-UP FLEET REPAIRS

Congress put over to January the appropriation for repairs to the lay-up fleet. This item, already planned for the budget period beginning July 1, will probably be approved in January for action immediately thereafter.

* * * * *

SHIPYARD WORK UNDER MSTS

Navy officials and the administrative officers of Military Sea Transportation Service insist there will be no changes in the Army's method of assigning former Army transports to private shipyards and the purchase of ship equipment from local private suppliers. We doubt it, but that's what they say!

* * * * *

LIFESAVING EQUIPMENT ON BIG LINERS GOES TO WELIN

Welin Davit and Boat Division of Continental Copper & Steel Industries, Inc. has been awarded contracts for lifesaving equipment on U. S. Lines' new super liner, on three American President Liners, three tankers for Philadelphia Tanker Corp., five tankers for Standard Oil and seven Army transports.

* * * * *

ATOM POWER PLANT FOR SHIPS

The Atomic Energy Commission has awarded a contract for engineering services which are reported to include the design of units of a prototype character for a ship propulsion power plant.

FIVE MILLION DOLLARS FOR RADAR

Costing between five and six million dollars since the end of the war, 453 ocean going merchant ships have been equipped with radar, announces the National Federation of American shipping. The market for radar is far from saturated. 54% of the vessels of reporting companies are fitted with radar equipment and 15% of the reporting companies have made no radar installations.

* * * * *

ARMY RADAR

Radiomarine Corp. has completed, during the past ten months, radar installation on more than 200 vessels of the Army Transport Service. These installations were made in six continental U. S. ports in addition to the Canal Zone, Alaska, Hawaii and Puerto Rico.

* * * * *

MARITIME COMMISSION CHARTERS WILL LAPSE

The Maritime Commission is advising bareboat charters that it does not intend to ask Congress for continued chartering authority after June 30 except in unusual circumstances. This may be one more step in the direction of encouraging new ship construction.

* * * * *

SUN SHIPBUILDING LOW ON ALEXANDER VESSELS

Lowest of six bidders on two vessels for Pacific Coast Steamship Co. (H. F. Alexander) Sun Shipbuilding and Dry Dock Co. bid $21,209,902 on a fixed price basis for two vessels, delivery to be in 525 and 600 days.

* * * * *

INGALLS LOW ON PROTOTYPE

The Maritime Commission has awarded a contract to Ingalls Shipbuilding Corp., Pascagoula, for the first, or cargo, prototype vessel. The adjusted price bid accepted was $4,744,000 plus $798,000 for engineering and design work.

* * * * *

INGALLS LOW ON DELTA MOTOR LINER

With the lowest adjusted price bid of $12,793,000 on the Mississippi Shipping Company's proposed motor liner, Ingalls Shipbuilding Corp. is low bidder. Four fixed price bids range from Newport News $12,690,000 to Bethlehem-Quincy's $13,916,000. Newport News also bid on an adjusted basis $13,960,000. The diesel engine has not been selected nor have certain defense questions been decided.

* * * * *

THINGS ARE HIGH IN ENGLAND TOO

The Royal Mail Lines announces that it will build no more ships while shipbuilding costs and ship operating costs remain at present levels. They have plans which will remain dormant until costs come down.

* * * * *

ATLAS DIESEL ENGINE REPORTS BIG SALES

Third quarter reports to S.E.C. by Atlas Imperial Diesel Engine Co., Oakland, shows sales $4,000,075 for three months ended August 31 compared with $1,975,000 a year ago.

* * * * *

OAKLAND BECOMES QUARTERMASTER'S WESTERN CENTER

The new Oakland Quartermaster Purchasing Office, formerly a branch of the Chicago office, will be responsible for procurement of subsistence items for the military in the western half of the country and the Pacific. The office is at the Oakland Army Base.

Marine Exchange Takes the Lead

By T. DOUGLAS MAC MULLEN

FOR 98 years the Marine Exchange of San Francisco has been signalling the arrival of ships, and on a call from its operator, many things begin to happen that affect the shipping industry in the great San Francisco Bay area.

The Exchange does more than signal, however. It is sparking a whole swarm of projects on which the welfare of the port depends, and is performing services to its members—and others—which are too seldom appreciated.

One service which it did *not* render, however, is historic, as will appear.

After several coffee houses had initiated ship reporting service on the then waterfront street called Liedesdorf*, the firm of Sweeney & Baugh in 1851 established the first "Merchants Exchange", and two years later opened a telegraph line to Point Lobos for the earlier sighting of ships.

In 1865 a group of merchants, headed by William C. Ralston, or-

*Liedesdorf Street was, in those days, the waterfront of San Francisco but the waterfront has retreated a mile or so eastward. Liedesdorf is a small street between Montgomery and Sansome and extends from Pine to Sacramento in the heart of the financial district.

SUCCESSOR TO RALSTON

FRED GALBREATH
President

ganized the Merchants Exchange on broader lines. The group included, in addition to Ralston, R. J. Sneath, Thomas H. Selby, Joseph A. Coolidge and Albinza Hayward. They fitted up a house for boatmen at Meiggs Wharf and operated a semaphore system from Pidgeon Point, Presidio House, and Telegraph Hill; and maintained an office on Battery Street, which they moved into their own specially erected building on California Street the following year. One of the earliest telephone lines anywhere was the one running from Meigg's Wharf to California Street.

In 1901, upon the assassination of President McKinley, Merchants Exchange service was discontinued to the *San Francisco Examiner;* whereupon the *Examiner* organized the Marine Exchange with similar functions. Two years later the Merchants Exchange and the Produce Exchange united to put up the Merchants Exchange Building, still standing at 465 California Street, and in 1911 they combined with the Downtown Association to form the San Francisco Chamber of Commerce which three years later closed down its Marine Department and subscribed to the *Examiner's* Marine Exchange. In 1924 they bought the Marine Exchange from the *Examiner* (for $2,500) and called it the Marine Exchange of the Chamber of Commerce. In 1938 the Marine Exchange was established as a

HARMON K. HOWARD
First Vice-President

RAYMOND V. WINQUIST
Second Vice-President

GERALD A. DUNDON
Third Vice-President

separate association affiliated with the Chamber of Commerce, and in 1949 was completely sheared off and separately incorporated. Happily for the industry, it is authorized to, and does, provide many types of business promoting services.

These services are limited only by the extent of participation which the Exchange can command among Maritime interests. It is ready to tackle any commercial problem of a maritime character, and it provides the means for group action. It has proved during recent months that its committees are virile and determined and that its management is able and hard working.

It takes more than mere pride of ancestry to carry the torch for maritime projects in the face of indifference and often veiled hostility on the part of those who should be in the vanguard.

It takes the type of men who are now directing the Marine Exchange to initiate and carry forward a World Trade Center project while skeptics laughed. It took a resilient spirit to keep the Foreign Trade Zone alive, and it took business leadership to organize the Bay Area Maritime Committee (forerunner of the Bay Area Council), support for a Bay Area Traffic Bureau, and a School of World Business. The efforts of the officers and committees in behalf of the cancellation of the California sales tax on ship equipment will benefit everyone in the industry far into the future. The tax fight is won, and so is the Foreign Trade Zone, School of World Business and many other important maritime projects, but the industry needs Marine Exchange energy and initiative on such projects as:

GENERAL ROBERT H. WYLIE
Treasurer

Protection of Local Industry Under Army and Navy Transport Consolidation

The Exchange has several groups at work for the protection of the multi-million dollar business which will be diverted from the West Coast as the Navy assumes jurisdiction over the Army Transport Service during the period from October 1, '49 to April 30, '50.

World Trade Center

This gigantic project has hurdled many obstacles and it now seems likely that complete success will be achieved. Manager Cremer of the Exchange is secretary of the World Trade Center Corporation.

West Coast Shipbuilding

Continuous pressure is being brought in many directions by the Exchange for the protection of West Coast shipbuilding and allied industries; the objective being the distribution of ship construction so that the West can participate.

Lay-Up Fleet Repairs

San Francisco Bay shipyards and supply houses as well as labor will benefit most from the national Reserve Fleet repair program. The greatest responsibility for the effort to begin work on reserve ships rests on San Francisco's Bay Area. Marine Exchange is the commercial group that is carrying the ball for the early and continuing repair program, which is now almost certain to begin during the fiscal year ending June 30, 1950. The second session of the present Congress is expected to approve the appropriation soon after the first of the year.

Small Boat Harbors

There are 20,000 commercial fishing vessels, 78,800 pleasure craft over 16 ft. long, and 6,000 workboats on the Pacific Coast. These all represent business for maritime interests and are limited in number by the facilities for mooring the boats. The Marine Exchange and its committees are active in expanding such facilities. Especially in the pleasure boat classification the number of boats can be greatly increased.

Everyone in the industry can recognize his dollars-and-cents stake in the growth of the Marine Exchange. He can, no doubt, come up with suggested directions for Exchange effort, and he can participate in the accomplishment of Marine Exchange success. He may help

M. A. CREMER
Secretary-Manager

in the development of the Traffic and Transportation Bureau; in the campaign for routing cargo through West Coast ports; in the effort for reduction or elimination of Panama Canal tolls; in the shaping of maritime legislation; in the promotion of foreign trade as well as coastwise and intercoastal ship traffic; and in the shaping of port publicity. He may need statistics on his type of business for assistance in overcoming competition from other areas. He should at least feel that everyone benefiting from Marine Exchange activities should be a member of the Exchange, and to require those with whom he deals to assist his industry by joining up also.

Directors

Under the new incorporation there are eleven directors who elect the officers. Present directors are:

A. E. Charles, admiralty attorney of the firm Lillick, Geary, Olson, Adams & Charles; Gerald A. Dundon, vice-president and general manager, Pope & Talbot, Inc.; Fred A. Galbreath, manager, Marine office of America; Albert W. Gatov, president, Pacific American Steamship Association; H. K. Howard, secretary, Howard Terminals; Lloyd B. Hughes, assistant manager, Port of Oakland; J. H. Jensen, terminals manager, Matson Navigation Co.; Joseph A. Moore, Jr., president, Moore Dry Dock Co.; H. J. Wilson, marine manager, Tide Water Associated Oil Co.; Raymond V. Winquist, vice president, General Steamship Corp.; Robert H. Wylie, manager for the Board of State Harbor Commissioners.

Running Lights

San Francisco Propellers' Golf Tourney

(Our photographer was kept busy covering this one. See opposite page for captions.)


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S. F. Propeller Club's Annual Golf Tourney

Some folks would call the annual September turnout of the San Francisco Propeller Club at Lakeside a horseshoe tournament. The majority still seem to think that golf is the important diversion, however, and judging from the loot which most of the members took home, the golf players were far in the majority.

Every year there is an expression of satisfaction and appreciation, and the consensus seems to be that the occasion was the best ever. This time there is even more such indication, in spite of the tournament having been held on the day before a three-day holiday.

CAPTIONS FOR PAGE 76

1. E. F. "Gene" Essner, Bethlehem, displays his golf prize. Jake Brigham of Bethlehem also won honors.
2. Ed Swain helping out handicapping committeemen, John Clerico and Les White.
3. Gene Hoffman, Oscar Beyfus, Paul Faulkner, Capt. Blackstone and Harold Rethmeyer. Even though all five of these men were snapped with their mouths open, guess which one is telling a story!
4. Steve Nelson, Heinrik Greges, Ted Jerstad, and Alan Scurfield, all of Anchor Equipment, playing on the 8th Green.
5. Sam Harrison watches demonstration of horseshoe technique by Carroll Reeves.
6. M. E. Porter and George McCord of Arrow Oil Co. and Harry Thompson, D. N. Lillivand, William D. Lynch and William E. Rodgers, all of W. R. Grace Co.
7. Henry Gelhaus, Todd's; C. E. Stith, American Bureau; T. E. Hansford, American Bureau; and Bob Christie, Todd's.
8. Ray Cedas, C. J. Hendry; Bill Schwartz, William R. Schwartz Co.; Charles Fowler, Bearing Engineering; George Robertan, Welin Boat.
9. Joe Granville, Hillcone S. S.; Ed Schneider, Moore Dry Dock; Ray Luce, Luce & Co.; Don D. Fleming of Don D. Fleming Co.; Jack Cannon of U. S. A. T.
10. Prize winners with prizes: Bob Lillivand, Grace; and Ray Luce, Luce & Co.
11. M. J. McCarthy, Berry & McCarthy; Jack Radford, Fairbanks-Morse; Ray Cooper, Fairbanks-Morse; Tom Ingersoll, Bethlehem; Ed Cahill, Sudden & Christenson.
12. Dearborn Clark, American Hawaiian, and George Cooley, Williams, Dimond & Co.
13. Joe Lewis of E. F. Drew, and Ed Cahill of Sudden & Christenson.
14. George Crow of General Electric, and Bob Mayer of Pacific Maritime Association.
15. Johnny Johnson of Republic Supply was 1949 winner of Pacific Marine Review perpetual Trophy for low net. Here he receives congratulations of president Ed Harms.

Eddie Martin, general chairman of the tournament committee, who always comes through with a well-managed affair. After this tournament Eddie didn't sell any Amercoat for three days. (They were holidays.)

At Propeller Club meeting of Sept. 21, Worth (Johnny) Johnson gets Pacific Marine Review Cup replacing the handshake and promise he received at the Annual Golf Tourney. With him are president Ed Harms, Golf Chairman Ed Martin and Fred Short of Todd's.

Henry Gelhaus, recipient of this year's Brass Hat, tries it on with the help of Ed Harms.

Eric Pedley takes practice swipe. Polo player Eric could probably do better with one hand and on a horse.

General Chairman Eddie Martin organized the affair in his usual efficient manner and came up with a committee which performed its duties at least as well as John Clerico of the handicap committee who seems, in one of the pictures, to be deciding the handicaps with dice, with Les White as a co-conspirator. David Norman Lillevand and Bernard Norman DeRochie handled the financing of the "gifts." Carroll Reeves and Sam Harrison organized the horseshoe competition. Bill Warren handled reception and everyone who had a ticket got in. Frank Cannon managed the dinner. Bill Quale furnished the Bethlehem-made signs, and did a good help-everybody job.

Worth Johnson was the top winner and was presented with the *Pacific Marine Review* cup at the Propeller Club luncheon later in the month.

San Francisco Delegates To N. Y. Propeller Club

At least nine members of the San Francisco Propeller Club will make the trip to New York this month for the annual Propeller Club meet and the Merchant Marine Conference. They are: Gene Hoffman of American President Lines and secretary of the Club; W. J. Feldcamp, Chief Hull Draftsman, Bethlehem; General Robert H. Wylie, San Francisco Port Manager; Carl McDowell of Stanford; Ragnar Kjeldahl, San Francisco Port Chaplain; M. J. Gigy, M. J. Gigy & Associates; Harvey Butt, Radiomarine Corp.; Capt. Henry Blackstone, U. S. Protective & Indemnity Agency; J. P. Bourne, Standard Oil Co.

Included in the picture above, at the farewell luncheon for Joe Hare in Los Angeles: Frank Boomer, Paul Gaudin, Frank Cavanaugh, Cy Cyrus, Jack Deckart, Ray Jones, Mike Kelly, George Curran, Fred Cordes, Roy Campbell, George McCoy, and Bert Hale. Joe Hare is sitting at the head of the table.

Maritime Commission Office at San Pedro Closed

Offices of the United States Maritime Commission, which were located in the United States Post Office and Customs Building, San Pedro, Calif., have been closed, leaving no resident or permanent representative of the Commission in the Los Angeles Harbor area.

All communications, documents and other material ordinarily transmitted to the San Pedro Office should in the future be sent to 180 Montgomery Street, San Francisco, for disposition and action.

When emergencies arise in the Southern California Area in connection with operations involving vessels in which the Maritime Commission has an interest, requiring the presence of a Commission representative, as much advance notice as possible should be given the San Francisco Office in order to allow sufficient time for a representative to be dispatched from San Francisco to the vessel at San Pedro, Wilmington or Long Beach for the purpose of effecting an inspection, survey or other type function.

Joseph T. Hare of the San Pedro office is transferred to Seattle where on November 1 he takes charge of the Maritime Commission's office for that area. Before leaving Los Angeles he was guest of honor at a luncheon at the California Club sponsored by the Los Angeles Steamship Association.

William T. Hayes, who has been in charge at Seattle, is retiring.

Joe Hare

Bert Hale, Secretary of the Port Engineers, makes presentation to Seattle-bound Joe Hare.

General Electric Film

General Electric Company has developed a new movie entitled "By Their Works", a story of American industry and the part electricity plays in developing industrial potentials. The film draws upon General Electric research, engineering, and manufacturing activities, but, as emphasized in introductory and concluding remarks by President Charles E. Wilson, the major contributions of General Electric to American industry is the men and women who make up the Company.

The film is in color and sound, and takes 45 minutes to run. It will be shown at various meetings around the country and will be available to civic groups in and out of the industry.

E. T. Murphy of Carrier Moves to San Francisco

Carrier Corporation announces that E. T. Murphy, Senior Vice-President, is now a resident of San Francisco. Our photo shows him, at right, conferring with John Kooistra, Branch Manager, in Carrier's San Francisco office, 251 1st St.

Sea Poetry Contest

In a search for poems about ships and seamen, the Seamen's Church Institute of New York is sponsoring a Marine Poetry Contest open to landsmen as well as to merchant seamen in every country in the world. Prize money has been donated and first prize for the best sea poem will be $100.00; second prize $50.00; and third prize $25.00. The judges are: Gustav Davidson, Louise Townsend Nicol, A. M. Sullivan, Dorothy Quick and Marjorie Dent Candee. Publication of the winning poems will be in the Institute's monthly magazine, *The Lookout,* and will also be included in a contemplated Sea Anthology.

Contestants are asked to send typed copies of their poems in triplicate, and to retain a copy as no poems will be returned. Poems must be in English, no more than 32 lines in length, and subject matter should be the sea, ships and merchant seamen. Free, blank or rhymed verse may be submitted. Contest closing date is April 1, 1950, and poems should be mailed to Marine Poetry Contest, Seamen's Church Institute of New York, 25 South St., New York 4, N. Y. Contestants should include name and address, and state that the poems submitted are original and never before published.

For many years the Institute has conducted an annual Marine Poetry Contest for seamen, and each month publishes a page of sea poetry in *The Lookout.* This is the first time the Contest has been opened to landsmen as well as seafarers.

Women's Organization Fashion Show

A successful fashion show was staged Sept. 15 at the Marines' Memorial Building by the Women's organization for the American Merchant Marine. Chairman of the affair was Mrs. C. W. Lowith and Co-Chairman, Mrs. Murvin E. Shigley. Chairman of the Reservations Committee was Mrs. Frances Waters, assisted by Mrs. Oscar Beyfuss, Mrs. John Gallagher, Mrs. Fred Soloman and Mrs. M. J. Gigy. Mrs. John F. Harvey was in charge of tickets, Mrs. Leslie White in charge of the music, and the publicity was handled by Mrs. Jerry Scanlon. Hostesses were Mrs. Frances Waters, Mrs. Charles Horn and Mrs. Vernon Keays.

Models were Mrs. Alfred Pittman, Mrs. Franklin Long, Mrs. Oscar Beyfuss, Mrs. Raymond Sample, Mrs. Bernard DeRochie, Mrs. Carlos Harrison, Mrs. Worth Johnson, Mrs. Irving La Fortune, Mrs. C. W. Lowith and Miss Alma Canavan.

First Row: Mrs. Oscar Beyfuss, Mrs. B. N. DeRochie, Mrs. Worth Johnson, Mrs. Franklin Long and Mrs. Alfred Pittman.

Second Row: Mrs. Carlos Harrison, Mrs. Irving LaFortune, Miss Alma Canavan and Mrs. C. W. Lowith.

Top: Mrs. Raymond Sample.

Walz and Krenzer's Pacific Coast Agency

C. T. Krenzer of Walz and Krenzer, Inc., Rochester, New York, announces the appointment of M. J. Gigy & Associates, 112 Market Street, San Francisco 11, as Pacific Coast agent for sales and service of Walz and Krenzer watertight door systems and associated equipment manufactured by their concern.

Walz and Krenzer fabricate and distribute electric and hand operated electro-hydraulic and combination hand and electro-hydraulic sliding watertight doors of both horizontal and vertical design. The company manufactures and distributes a complete line of watertight control apparatus including Cutler-Hammer door operators, mechanical and electrical indicating and signalling devices, hand wheels, universal joints, couplings, bearings and all required appurtenances for complete installation of watertight door systems of approved Coast Guard designs. In addition to the above, Walz and Krenzer manufacture and distribute electro-hydraulic steering gears, hydraulic test pumps, hydraulic presses, electro-hydraulic presses and welding positioners, all of approved design and manufacture.

The firm has recently supplied doors and operating gear for the *Del Santos*, doors and operating gear on the *Sergeant Mueller* and *Sergeant Keithley,* for the Army Transport Service, and nine watertight doors on the M.V. *Imperial.*

Martin Has Rust-Tox and Ospho

The W. Edgar Martin Company announces its appointment as exclusive Northern California distributor for "Rust-Tox", an inexpensive high-covering coating that can be applied directly over rust, and "Ospho", a phosphate-chromate metal primer. The Martin Company is also marine distributor for "Amercoat" plastic paints.

McConkey Joins Marine Electric

J. F. McConkey, long-time manager for Sperry in San Francisco, has become affiliated with Marine Electric Co. The firm specializes in marine and industrial wiring, and the jobbing of electrical supplies, as well as the repair and maintenance of motors.

World's Largest Fish Market at L. A. Gets New Building

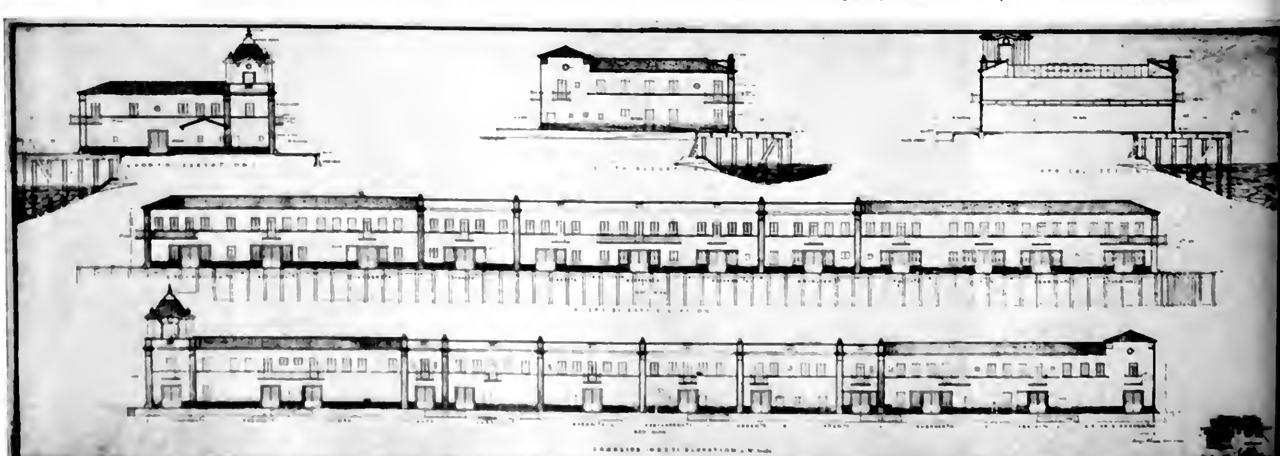
Los Angeles Harbor, now housing the world's largest commercial fishing industry, is modernizing the Municipal Fish Markets at a cost of $577,000. Twelve fish markets will be housed in the new buildings to be erected at Berth 72, adjacent to the new $1,265,000 Fishermen's Wharf, Main Channel. The new 420 x 80 foot, two-story structure will replace the ancient wooden market building at Berths 79-80, which have been in use since World War I. Contract calls for completion of the job in nine months. In addition to the 420 x 80 building, a separate building will house refrigeration machinery.

With the completion of the fish markets, Los Angeles $100,000,000 Harbor will have the best and most modern facilities in the world to serve the 700 commercial boats and for distribution of fresh fish to the Los Angeles Metropolitan area, according to Harbor engineers.

Building of the fish markets is part of a modernizing program calling for the expenditure of $10,000,000 which will be awarded for new construction throughout the Harbor area between now and next spring. Projects include passenger marine and cargo terminals, transit sheds and new wharfs and docks.

Since 1945, the Los Angeles Harbor Commission has authorized the case expenditure for land and buildings, equipment and construction totaling $7,558,303. The construction has resulted in new transit sheds, wharves, docks and roadways and other improvements bringing the Harbor to the peak of efficient operation.

New Los Angeles Harbor Municipal Fish Markets costing $577,000, part of the $17,500,000 Los Angeles Harbor postwar construction program, are shown below. In the plans, the top drawings (left to right) show the north elevation, south elevation and a typical section. The center drawing shows the waterfront side, or east elevation, and the bottom drawing is of the land side of the structure. The first story of the structure will be of reinforced concrete and the second of timber frame and stucco. Cleaning and processing of fish will take place on the first floor and office and storage space will be provided on the second.



Worthington's New West Coast Sales Office

In the August PACIFIC MARINE REVIEW mention was made of the appointment of John P. McArthur, as West Coast Sales Manager for Worthington. Permanent headquarters have now been established at 2018-19 Russ Building, San Francisco.

Radiomarine Appointments

Harvey R. Butt, Manager of Sales for the Pacific Coast Region of Radiomarine Corporation of America, announces the appointment of John F. Parachini as manager of sales and service for Northern California, with headquarters at San Francisco, and the appointment of C. T. McClellan who has assumed the duties of manager of sales and service for Southern California, with headquarters at Los Angeles.

A. H. Terry Is DFA for PFE

Pacific Far East Line Inc., announces appointment of A. H. Terry as district freight agent in San Francisco.

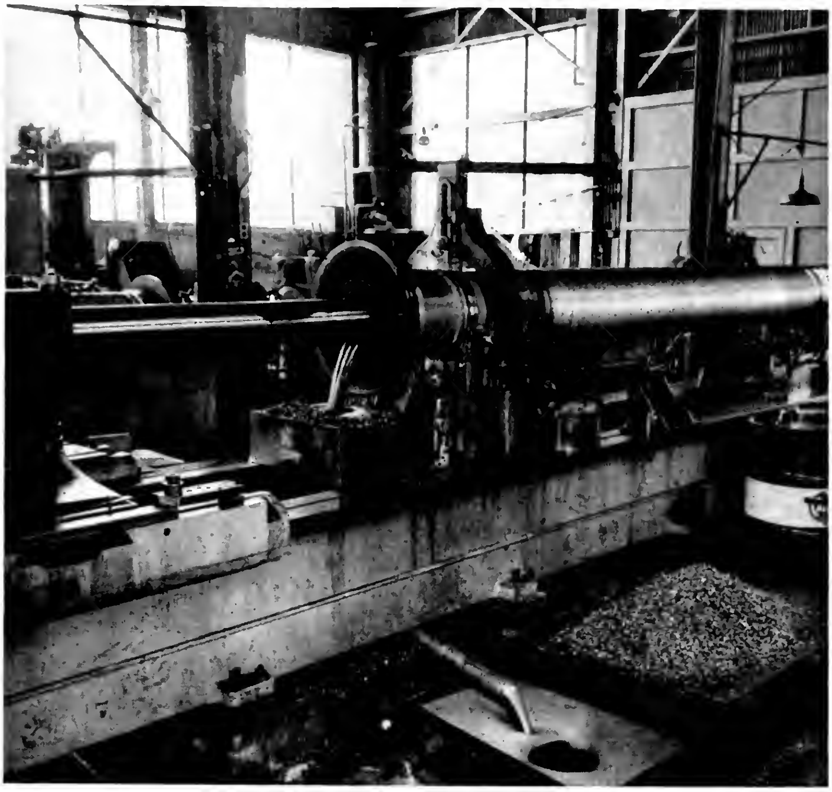
Well known in steamship circles in the Orient for many years, Mr. Terry was general agent in Manila for United States Lines in 1946-1947. From 1933 until the outbreak of the war he was freight agent there for the Dollar Line and its successor company, American President Lines. He was agent in Cebu for the Dollar Line from 1928 to 1933. His varied steamship career also included one year in Yokohama and one in Hong Kong.

He was interned in Santa Tomas and Los Banos from 1942 until 1945. He is regarded as an authority on trade, conference, and port problems in the Orient.

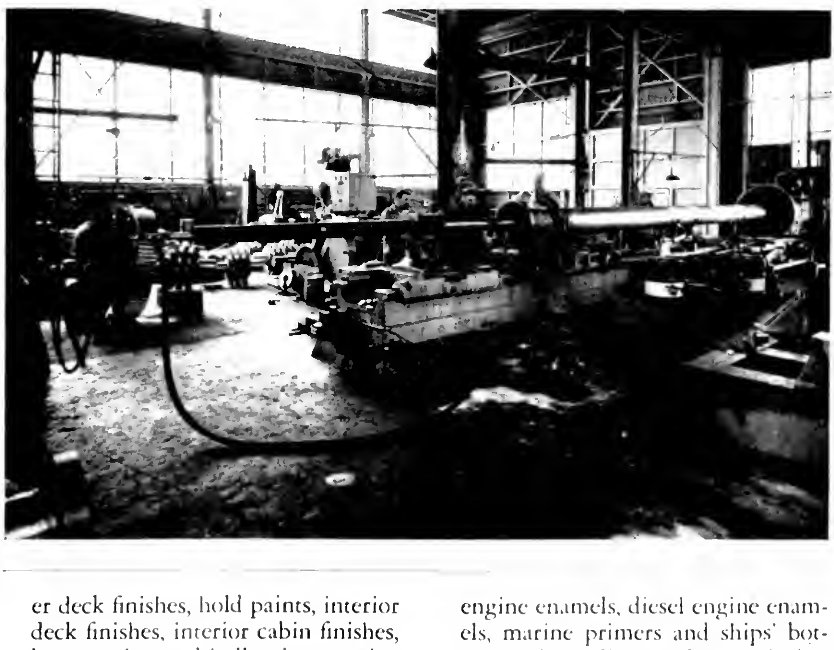
National Lead Paint Booklet

The National Lead Company has available a new marine paint booklet with samples of Dutch Boy marine finishes. Color samples include topside and mast finishes, stack and funnel paints, signal enamels, weather deck finishes, hold paints, interior deck finishes, interior cabin finishes, boottopping and hull paints, engine department finishes, machinery and engine enamels, diesel engine enamels, marine primers and ships' bottom paints. Dutch Boy painting supplies are also listed.

Hollow Boring of Navy Stern Tube Shafts



The upper picture shows a shaft 14½" in diameter and 32' long in the process of boring at the plant of the Columbia Machine Works, Berkeley, California. The lower picture gives a view of the whole set-up, including the boring bar as well as the method of circulating the fluid from the drain tank through the bar and return. The fluid has the dual purpose of keeping the boring tool cool and washing out the boring chips. The hole in these shafts is 9" in diameter, 26' deep from one end, and 7" in diameter and 6' deep from the other end.



Apple pie will be supper dessert on the S.S. "Ohio Sun." Preparing to remove the freshly-baked pies from the spacious electric oven is relief cook Linwood Hitch. Up-to-date galley equipment on Sun tankers includes electric mixers, griddles and dishwashing machines, the finest cutlery, stainless steel and aluminum vessels.

Sun Tankermen Fare Well

Our Sun, publication of the Sun Oil Company, furnishes some enlightenment on the living conditions aboard Sun's tankers. A typical steward's daily ration sheet for the S.S. *Mercury Sun* shows the following menu:

BREAKFAST

Grapefruit
Cream of Wheat
Choice, dry cereals
Scrapple
Eggs to order
Hot cakes
Fried potatoes
Fresh milk
Jelly
Bread—butter
Coffee—tea

DINNER

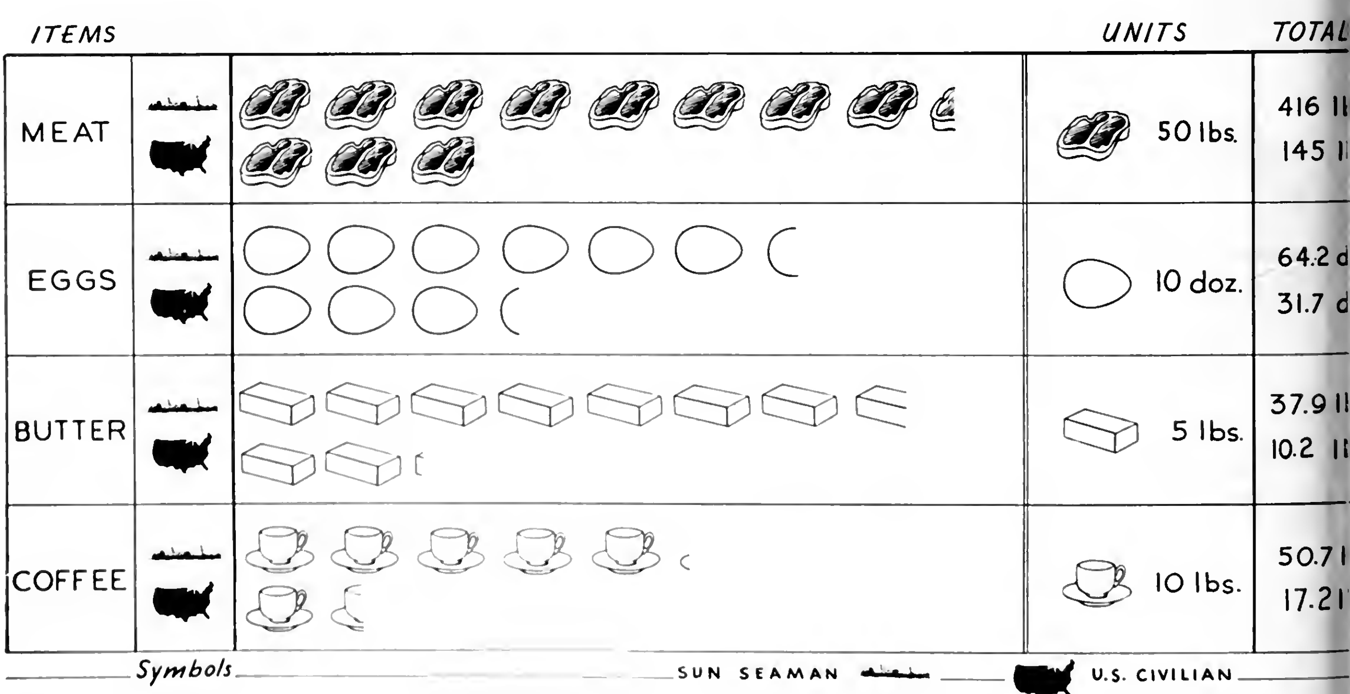
Cream of celery soup
Roast fresh ham
Dressing
Brown beef stew with vegetables
Braised cabbage
String beans
Mashed potatoes
Apple pie
Crackers
Bread—butter
Coffee—tea

SUPPER

Lettuce
Tomatoes
Veal cutlets
Spaghetti, tomato chicken sauce
Green peas
Spanish potatoes
Peach ice cream
Cake
Cold meats
Cheese
Bread—butter
Coffee—iced tea

Comparison of estimated 1948 food consumption, per capita: Sun tankermen and national average for U. S. civilian populati

*Source, U. S. figures: U. S. Bureau of Agricultural Economics.



Radiomarine Radar at Training Station

The U. S. Maritime Commission recently purchased a Radiomarine 3.2-centimeter commercial shipboard radar, which has been installed at the U. S. Maritime Service Training Station, Sheepshead Bay, New York, as a modern training aid.

An eight weeks intensive radar course is available to qualified personnel attending the Sheepshead Bay training station. Ideally located, the School affords an excellent radar view of the surrounding area. The new Radiomarine model CR-101-A radar is installed in a classroom and the antenna is mounted on a tower atop the roof, 65 feet above the ground.

The radar antenna makes a 360 degree sweep of the surrounding area and the PPI (Plan Position Indicator) picture includes a view of Jamaica Bay, entire New York Harbor, North and East Rivers and the New Jersey Coast. Trainees track ocean liners, work boats and pleasure craft on the twelve inch scope as they ply the waters within radar range.

Radiomarine radar technician, Dick Scanlan, points out the features of a model CR-101-A 3.2-centimeter radar to (left to right) Lt. Comdr. John J. Canavan, USMS, senior radar instructor, and Lt. Milton Snitzer, USMS, his assistant, of the U. S. Martime Service Training Station, Sheepshead Bay, while J. C. Affleck, Advertising Manager of Radiomarine, looks on.

C. J. Stettin Joins Port of Seattle

J. A. Earley, President of the Port of Seattle Commission, has announced the appointment of Carlos J. Stettin as Assistant to the General Manager, Warren D. Lamport.

Stettin was for many years with Matson Lines and more recently was Northwest District Passenger Agent for Alexander & Baldwin, Ltd., and included Washington, Oregon, Idaho, Montana, Alaska, and British Columbia and Alberta, Canada in his territory.

Stettin's experience in steamship operation began in 1928 with McCormack Steamship Company as a radio operator and clerk. In 1931 he joined Matson Lines and progressed to Chief Purser aboard the *Lurline, Matsonia,* and *Mariposa.* During the ten years preceding World War II he was frequently assigned ashore to various departments of the company, gaining invaluable knowledge of the Pacific islands, Australia, and New Zealand.

He was Chief Purser aboard the S.S. *Mariposa* when war was declared. He was commissioned a captain in the Transportation Corps, AUS, and served in various assignments in Australia and the Far East. He was promoted to the rank of Lt. Colonel with final assignment as Supply Officer, New Orleans Port of Embarkation.

C. J. Stettin

Stettin will take over the administrative detail heretofore handled by the General Manager as well as the duties of Hal Reid, Operating Superintendent, who retired October 1.

Bob's 30 Years of Grace

On September 29, 1919 David N. Lillevand (below) joined the Grace Line as office boy. On September 29, 1949 he was presented with a silver plaque representing 30 years service with the company. During that time he has risen to vice president in charge of Pacific Coast operations, and is a leading figure in the shipping industry on the Pacific Coast.

Wilder New Alcoa Marketing Manager

Hugo T. Wilder, a veteran member of Alcoa's sales organization, has been made manager of the Company's newly-formed marketing division. Wilder's appointment was announced by D. Wilmot, vice presiident in charge of product sales for Aluminum Company of America.

The marketing division is a new branch of the Alcoa sales organization. Among its main functions will be: the study of marketing methods and selection of sales outlets for products which reach the consumer through wholesale and retail channels; the conduct of market surveys; and the supervision of sales statistics.

Wilder has been with Alcoa since 1919. After serving with the Company's New York sales office, he was made manager for Alcoa pig and ingot sales with headquarters in Pittsburgh. In 1946, he assumed the additional duties of warehouse manager for the Company, including supervision of Alcoa's nationwide distribution system.

West Coast Port Officials

GENERAL ROBERT H. WYLIE
Port Manager at San Francisco
—Has been elected president of the California Association of Port Authorities succeeding to the unexpired term of the late Los Angeles Commissioner, C. S. Sampson.

Carl Smith, secretary of the San Francisco Harbor Board, becomes secretary of the Association.

CLAIRE V. GOODWIN
—Re-elected president of the Oakland Board of Port Commissioners.

Elected first vice-president was Stanley A. Burgraff; second vice-president, Dudley W. Frost. Port Manager A. H. Abel was re-elected secretary and J. G. Bastow, assistant secretary. Newly appointed to the Board is H. W. Estep.

B. J. FEIGENBAUM
President of State Board of Harbor Commissioners, San Francisco.
Following the recent resignation of N. Loyall McLaren as president of the State Board of Harbor Commissioners and the appointment of Fuller Brawner to the vacancy, Commissioner Feigenbaum was named president.

Ets-Hokin Acquisitions

Jerry Lalor

Introducing to PMR readers the two Jerrys with Ets-Hokin & Galvan.

One of the newest members of the marine electric supply firm is Jerry Ets-Hokin, who joined his father's business during the summer months, upon graduation from Stanford where he majored in psychology and engineering.

Many oldtime waterfronters will remember J. M. "Jerry" Lalor who is a recent appointee to E-H & G's

Jerry Ets-Hokin

sales and service staff.

Jerry Lalor came to the Coast in 1919 to establish the first branch office of Chas. Cory & Son. He served as Pacific Coast Mgr. with the marine instrument manufacturing concern which was later taken over by Bendix Aviation.

In 1932 he established the Lalor Electric & Engineering Co. During the ensuing years he has been associated with the U. S. Maritime Commission as marine electric inspector, later with Matson Navigation as electric expediter, and with Joslyn & Ryan as electric estimator.

Prior to joining E-H & G he sailed with the U. S. Army Transport Service as chief electrician on several transports including the *General Walker.*

Tubbs Cordage Enters Eastern Market

Fredrik B. Paulsen, President of the Paulsen-Webber Cordage Corporation of New York, and W. I. Atherton, Sales Manager for the Tubbs Cordage Company of San Francisco, announced jointly that Paulsen-Webber has been appointed exclusive Eastern Sales Representative for the 93-year old California firm's products.

The Tubbs Company, whose mills are located in Seattle, San Francisco and the Philippine Islands, has been prominent in West Coast, Gulf and Intercontinental trading areas for many years. Their arrangement with Paulsen-Webber represents their first entry into the eastern market.

The Tubbs line, as well as other rope brands, is available from stock at Paulsen-Webber's branches in Boston, Philadelphia, Baltimore and Norfolk in addition to the main office at New York.

Amer. Chain Names Woodward Div. Sales Mgr.

S. J. Woodworth has been appointed Sales Manager of the Wright Hoist Division of American Chain & Cable Company, Inc., with headquarters at York, Pa. He succeeds A. R. Haskins who has resigned from the company to establish a business in Milwaukee. Woodworth has been with the Wright Hoist Division for over 25 years, and has had wide experience with hoisting applications and materials handling problems.

Todd Converting Liberty Tankers to Cargo Carriers

Todd Shipyards Corporation is converting three Liberty tankers to cargo carriers at its Hoboken and Brooklyn Divisions. The vessels involved are the *Westport,* owned by Blidberg Rothschild Co., and the *Thomas F. Cunningham,* owned by Prudential SS Co., at the Hoboken Division; and the *Yankee Pioneer,* owned by the Mar-Trading Corp., which is now at Todd's Brooklyn yard.

These three conversions bring to a total of 9 the number of Liberty tankers which have been or are now being turned into dry cargo carriers. The move represents a trend brought about by the slackening of the tanker market and the increased demand for cargo bottoms caused partly by the heavy volume of ECA shipments to Europe.

All told, sixty-one Liberty tankers were built during the war, of which one was sunk, and 47 were sold to private operators. The U. S. Maritime Commission still has 13 of them in the lay-up fleet.

On each vessel, all of the center line and transverse bulkheads in the nineteen cargo tanks in five holds not needed for the new service will be burned off and removed as well as tank tops, ladders, and manhole covers. Two pump rooms on each vessel will be dismantled, and all piping, valves, heating coils will be removed. Steam smothering lines will be relocated.

Additional winches will be provided for each vessel to bring to a total of six on each, as with standard Liberty cargo ships, and the present number of five-ton steel cargo booms will be increased to provide a total of ten, two for each hold. Approximately 5,000 feet of cable rigging will be furnished for each vessel.

In addition, necessary voyage repairs and general overhauling is called for in the conversions. It is expected that the work should take approximately one month for each vessel.

Pegg Appointed to Los Angeles Harbor Commission

Albert O. Pegg

Albert O. Pegg of San Pedro has been appointed to the unexpired term of the late C. S. Sampson on the Los Angeles Harbor Commission. He will serve until July 1, 1950.

Pegg was formerly in charge of marine construction for the Union Oil Company, and still serves that company in an advisory capacity. He was also formerly assistant general manager of the California Shipbuilding Company.

History of Bethlehem

(Continued from page 34)

the Pacific Coast since the war. This was successfully completed on the *Sainte Helene,* a 320-foot coastal motorship purchased from the Maritime Commission out of the lay-up fleet by the French Government, which was rigged with 17,557 feet of Bethlehem wire rope.

Work at the San Francisco yard during 1948 was highlighted by such important jobs as conversion of the T-2 Tanker *Northfield* to a molasses carrier; drydocking of the *Lurline* prior to her postwar maiden voyage as a luxury liner; and the largest hull-strapping job on the Coast, which was performed on the T-2 Tanker *Elk Basin.*

This completes the condensed history of a Century of Progress at the San Francisco Yard. We have seen how, from a humble beginning as a two-man smithy one hundred years ago, this yard has grown steadily into the property it is today—one of the largest privately-operated shipbuilding and ship-repair yards in the United States, *and the oldest, from a standpoint of continuous operation.*

But repair work at the San Francisco Yard is not confined entirely to ships. Special equipment is on hand and skilled personnel available for virtually any type of industrial job for the yard's inland customers. The yard has built machinery for the locks of the Panama Canal, plow discs, galvanizing tanks and a wide variety of steel fabrication for industry, not only in the Bay area, but also for the west coast as a whole. Probably no other industrial concern has played such an important part in the economic life of a single community as has the San Francisco Yard.

Backed by many decades of shipbuilding and ship repair experience, staffed by skilled workmen in all crafts and equipped with machinery and facilities virtually unequalled on the Pacific Coast, the San Francisco Yard is looking forward to a future of even greater service to shipowners and operators.

Westinghouse President Tours West

Gwilym Price

Gwilym Price, president of Westinghouse, toured the West last month, inspecting the greatly expanded Westinghouse installations.

Of special interest to the maritime industry is the giant turbine-building equipment at Sunnyvale. Several articles relating to Sunnyvale turbine production have recently been published in the *Pacific Marine Review.*

James Crough Represents Hydraulic Press

The Hydraulic Power Division of The Hydraulic Press Mfg. Company, Mount Gilead, Ohio, announces the appointment of James F. Crough as Western Representative for its line of hydraulic pumps, fluid motors, valves, controls and power units. Crough will handle both marine and industrial applications.

Jim Crough has had a vast experience in hydraulics, as a service engineer for the Lidgerwood Company, and was in charge of the installation of the hydraulic steering gears on 170 ships during World War II.

He has also acted as instructor at the Marine Officers School through the University of California, and is an Associate Member of the Society of Naval Architects and Marine Engineers.

His office is at 607 Market Street in San Francisco.

Washington Aluminum Co. Appoints Pacific Coast Agents

Robert Sanford, Vice President of Washington Aluminum Company, Washington, D.C., announces the appointment of M. J. Gigy & Associates, 112 Market Street, San Francisco 11, as Pacific Coast Agents for all aluminum marine equipment manufactured in their new plant at Baltimore, Maryland.

Washington Aluminum Company specializes in the design and fabrication of spark-proof and corrosion resistant fixed and feathering tread accommodation ladders, as well as all aluminum gangways and brow aprons. Fixed or feathering tread accommodation ladders can be had in one or two sections, of any required length, with or without platforms, and complete with stowage fittings, 180 degree rotating upper platform, required bridle for handling and shell and dock rollers.

The Gigy firm has recently sold full weathering type accommodation ladders to the Commercial Ship Repair at Seattle, Washington for installation aboard Army Transports.

Exide Announces New Battery Cell-Filler

A new and improved Exide Battery Cell-Filler is announced by The Electric Storage Battery Company, Philadelphia.

The new Cell-Filler will enable maintenance men to add water to batteries quickly, accurately and easily. It is adapted to batteries used for marine service.

It is made in three sizes—45" length for railway car lighting and air-conditioning batteries; 30" for Diesel electric locomotives; and 15" for industrial trucks, and certain types of marine batteries. It has been field-tested thoroughly in these services.

Exide Batteries New Cell Filler.

The Exide Cell-Filler consists of a tube with a nozzle at one end and at the other a handle which is equipped with a Lunkenheimer valve operated by finger control. At the valve or handle end is an electric signal lamp which flashes a warning when the water in the cell reaches the correct level.

Thag

Todd Shipyards Corporation's Combustion Equipment Division, of Elmhurst, L. I., is offering to manufacturers and others, two standard models, portable and stationary, of "THAG," its line of heated air generators, along with its line of fuel-burning and other combustion equipment. THAG means Todd Heated Air Generator.

The standard units are capable of producing a steady supply of air with temperatures up to 600 deg. F. at 1,000 CFM. Special THAG units are also available which can produce 40,000 CFM at 950 deg. F. and 200 P. S. I.

For the past two years, THAG units have been used extensively at shipyards for quick drying ship's hulls so they could be painted for fast turnarounds; melting ice in cargo and ballast tanks, thawing pipes and valves; and for drying out enginerooms of vessels that have been sweated, flooded or submerged.

In all cases, THAG has handled these difficult assignments at a considerable saving of time and cost. For example, it was employed to dry the bottom of the huge liner *"Nieuw Amsterdam"* in just a few hours enabling the yard to perform an overnight painting job even though the night air was particularly humid. It has been particularly effective in quick-drying wooden hulls of vessels shortly after being drydocked.

Last winter, THAG was used frequently to melt ice in tanker double-bottoms, pipes and valves. Normally, this is accomplished with air hammers or by ultra-violet lamps, both costly and delaying methods. It was also used to dry out all the equipment in the engineroom of a tanker that had been partially sunk and half submerged in water, performing a job in five days that would normally have taken weeks using the usual steam-heated copper coils and ultra-violet lamps.

One of its most novel applications was warming the holds of a cargo vessel being loaded with potatoes intended for European countries, to prevent the potatoes from freezing in last February's zero weather.

The THAG units consist of a Todd-Thermo, heat exchanger which absorbs the heat efficiently to 81-82%; an all-metal combustion chamber fitted with temperature indicator and safety limit controls; complete fuel pumping, straining system and air pressure fans. All components are assembled as a package on one base. The auxiliaries and controls are all mounted integral with the machine. A simple push-button operation sends all moving parts into coordinated action. When the fuel valve is opened by the push-button, the fuel is ignited, and the desired constant, controlled, clean, dry air is quickly delivered at the desired temperature. No refractories are utilized—no warming time is lost.

The portable unit, Model "P", Type A, weighs 2,250 pounds, and is equipped with handling gear and

is for mobile use in shipyards, assembly plants, etc. It is equipped with its own fuel tank.

Model "S", Type A, the stationary unit, weighs 2110 pounds and is mechanically similar to Model "P" in every respect except that it has no fuel tank or lifting gear and is designed for permanent installation. Both units are 76" long, 24" wide and 62½" high.

Westinghouse Appointments

Walter J. Maytham, Jr., formerly of Chicago, has been appointed Pacific Coast district manager for the Westinghouse Electric Corporation.

He will take over the duties which have been carried on by Chas. A. Dostal, vice president, who retires next May after more than 43 years' service with the company. For the last 10 years, Dostal has been in charge of the company's sales in the nine western states, Alaska and the Hawaiian Islands. Dostal will handle special executive assignments in the Pacific Coast District until his retirement.

Walter J. Maytham, Jr.

Maytham will make his headquarters in San Francisco. For the past five years he has been manager of industrial sales in the company's Northwestern District, with headquarters in Chicago.

Joining Westinghouse in 1926, Maytham served as an industrial salesman in the company's Indianapolis office until 1929 when he was transferred to the Northwestern District's headquarters in Chicago. He was appointed manager of the Petroleum and Mining Section of the Industrial Division, Northwestern District, in 1938 and held this position until his promotion to manager of Industrial Division of the Northwestern District in 1944.

J. N. Jones

J. N. Jones of Redwood City, has been named electrical superintendent for the Pacific Coast District, Westinghouse Electric Corporation.

A graduate of Carnegie Institute of Technology, Jones joined Westinghouse in 1936 at East Pittsburgh, Pa., as an engineer in the Central Engineering Department. He served there in various capacities until his transfer to the company's Los Angeles office in 1942 as a consulting and application engineer. He was appointed electrical service supervisor there in 1946, and served in this capacity until his transfer to the San Francisco office to take over his present assignment.

Columbia Steel Appoints Noack Division Vice-President

Harold Q. Noack has been named Division Vice President, Central Sales Division of Columbia Steel Company, a United States Steel subsidary, announces O. L. Pringle, Columbia's Vice President in charge of sales.

Noack, who recently joined Columbia Steel Company as assistant to Pringle, will direct sales functions in Central and Northern California. The Division offices are located in the Russ Building, San Francisco.

Before coming to Columbia Steel Company, Noack was Pacific Coast Manager for Phelps Dodge Copper Products Corporation.

Sun Oil Company's Seaman Memorial

Ceremonies in honor of 141 merchant seamen who lost their lives aboard Sun Oil Company tankers sunk or damaged during World War II will be held both ashore and at sea on Saturday, October 8.

The observance ashore will feature the dedication of a nine-foot bronze statue of a seaman, mounted on a granite pedestal, in a small park at the entrance to Sun's Marcus Hook, Pa. refinery.

Maritime Commissioner Joseph K. Carson, Jr.; Rear Admiral R. E. Schuirmann, Commandant of the Fourth Naval District, and J. Howard Pew, former president and now director of Sun Oil Company, will be the principal speakers. Joseph N. Pew, Jr., chairman of Sun's Board of Directors, will preside.

At the same hour as the shore observance, tanker crewmen will assemble on ships at sea for memorial services followed by the traditional launching of commemorative wreaths upon the waters.

Four survivors of Sun ships torpedoed by German submarines will place wreaths at the base of the Seamen's Memorial at Marcus Hook. Four Sun tankers were sunk by Nazi torpedoes and a fifth exploded in New York Harbor while engaged on a war mission.

The idea of erecting a memorial to Sun tanker seamen who were lost at sea as a result of submarine attacks originated with fellow crewmen. Later other Sun employees and the Company contributed to the fund that ultimately reached $75,000.

It is believed that the Sun Seamen's Memorial is the first of its type erected in honor of merchant seamen killed in war service. Mounted on its pedestal, the monument will rise 17 feet above the surrounding area. Flood lights will play upon it at night so that it will be clearly visible at all times to ships passing on the Delaware River nearby.

Wm. Bennett Admitted to Worshipful Company of Shiprights

A meeting of the court of assistants of the Worshipful Company of Shiprights was held last month at the Vintners' Hall, London, Sir William Currie, the Prime Warden, presiding.

Among others, William Bennett, Principal Surveyor of Lloyd's Register of Shipping in the U.S.A., who has just returned from a visit to London, was admitted to the freedom and livery of the Company.

Dr. James McNeill, Managing Director of Messrs. John Brown & Company of Clydebank, was elected to the Company on the recommendation of the wardens and will be admitted to the freedom and livery at future meetings of the court.

The Earl of Inchcape, A. D. Pelly and others were admitted to the livery of the Company, sworn in and welcomed.

A dinner was held in the Vinters' Hall after the meeting of the court, at which Air Marshal Bowhill, of the Honourable Company of Master Mariners, Esmond Burton, deputy master of the Vintners' Company, members of the court and livery, and other guests were present.

Book Review

HANDBOOK OF EXPORT TRAFFIC. By Charles J. Moran. Published by Duell, Sloan & Pearce, Inc. (Sept. 1949) $3.00.

An invaluable aid to the export traffic man is this handbook, written by an authority on freight shipping. The author is Assistant General Freight Manager of Cunard White Star Ltd.

The Handbook deals with inland transportation, cartage, and ocean transportation and the fundamentals of packing, marking, documentation, insurance, and the collection of the bill of sale. Included is the complete text of the standard commercial credit customs and practices as given by the International Chamber of Commerce, and the complete text of "American foreign trade definitions." The book contains 32 pages of tables and conversions and a glossary of terms and abbreviations. There are reproductions of the basic forms used in export traffic and 16 pages of photographs.

"Mormacland" Receives Naval Reserve Pennant

At a ceremony at Pier 9 (September 20) the S.S. "Mormacland" became the 21st Moore-McCormack ship to receive the Naval Reserve Pennant. The Pennant was presented by Read Admiral Lynde D. McCormick, USN, Commandant 12th Naval District, to the ship's commander, Capt. H. E. Hansen. To qualify for the Pennant the ship's commander and 50 per cent of the ship's officers must be members of the Naval Reserve.

Top: K. C. Tripp, Pacific Coast Manager of Moore-McCormack; Capt. H. E. Hansen; Rear Admiral Lynde D. McCormick, USN.

Bottom: H. K. Grady, Moore-McCormack; Lloyd Fleming, Maritime Commission; Capt. Malcolm Crossman, Superintendent, U. S. Maritime Academy, Alameda; Capt. H. P. Peterson, Moore-McCormack; R. C. (Dick) Tripp, Moore-McCormack; Harriet Johnson; Capt. H. C. Perkins, Chief of Staff, 12th Coast Guard District; H. B. Riley, Deputy Collector of Customs.

Sliding Cargo Decks

A new rolling cargo deck, designed to facilitate cargo stowage and speed up marine cargo handling operations, was demonstrated recently at the Brooklyn Army Base before representatives of the steamship industry, stevedore industry, Navy, Coast Guard, Port of New York Authority, the press and interested newsreel and television agencies.

The device, an invention of Merchant Marine Captain V. C. Farrell, of Englewood, N. J., has been installed after Army and Bureau of Shipping approval aboard the Army Transport *Pvt. Francis X. McGraw*. It consists of two movable steel platforms superimposed on the deck of the hold which roll back into the wings simultaneously, after loading, thus saving time ordinarily required to carry or "snake" each package of cargo into its assigned space. In the reverse operation, the movable decks are rolled back to the centerline for unloading through the regular hatch opening.

Welin's Aluminum Boats

Latest addition to the aluminum pleasure boat fleet is Welin Davit and Boat's new 14′6″ lightweight Run-A-Bout. Smartly painted white inside and out with royal blue seats and floor boards, the craft's rugged Alcoa aluminum hull is designed to take plenty of seagoing abuse.

Run-A-Bout is produced in both inboard and outboard models. Inboards are equipped with a standard 4 horsepower, air-cooled engine, boasting speeds up to seven miles per hour and larger motors can be accommodated if more speed is desired. Recent tests conducted on a windy day in Raritan Bay with a 10 horsepower engine gave Run-A-Bout an 18 m.p.h. average!

Alcoa 61S-T6 alloy, highly resistant to salt water corrosion and good strength properties, has been used throughout. Bottoms of the boats are equipped with wood ribbing rails for additional protection when beached on gravel or rocky shores.

Weighing only 200 pounds (not including outboard motor), Run-A-Bout makes generous use of 16 gage aluminum for hull plating, decking and framing; 1/8″ x 3½″ flat aluminum bar for her keel; 1/8″ diameter buttonhead aluminum rivets for joining, and contains aluminum air tanks for emergency flotation. She was designed by Philip L. Rhodes, renowned New York naval architect.

Welin Davit and Boat's new 14 ft. 6 in. Run-A-Bout.

PAB Line to Inaugurate Direct Service to Pacific Coast Ports From Dominican Republic

Pope & Talbot, Inc., agents for the Pacific Argentine Brazil Line, have announced that effective in November, P A B Line vessels will inaugurate a direct service from the Dominican Republic to Pacific Coast Ports.

The first P A B Line vessel to said on the new schedule will be the *P & T Seafarer* which will sail from Puerto Plata around November 20, via the Panama Canal to Los Angeles, San Francisco, Portland, Seattle and Vancouver, B. C. It is the intention of the company to maintain a monthly service from the Dominican Republic to the Pacific Coast.

Pacific Coast Winners In Propeller Club Contest

Winners have been announced in the third annual American Newspaper Contest sponsored by The Propeller Club of the United States for the purpose of according recognition to the American newspaper writers who covered the many developments of American maritime progress during the year ending June 30, 1949.

Newspaper writers in every part of the United States were invited to participate in the competition. Entries in the competition dealt with every phase of American commercial maritime activity—ocean, coastwise, and inland waterway shipping; river and harbor activities; shipbuilding, repair and allied occupations. The competition was divided into three groups: (1) Best news article; (2) Best feature article or series; and (3) Best editorial article.

First prize in each group is $250.00 in cash; second prize, $100.00; and third prize, $50.00. In addition, each winner will receive a handsome commemorative plaque,

and will be the guest of The Propeller Club of the United States, with traveling and hotel expenses paid, at the Twenty-third Annual Convention and American Merchant Marine Conference which will be held in New York, October 19, 20 and 21, 1949.

Winning entries in news articles were: First Prize—George Horne, New York Times. Second Prize—Julian Griffin, The Cleveland Press. Third Prize—Ford Eastman, Duluth News Tribune.

First prize in editorials went to Darsie L. Darsie, Los Angeles Herald Express, with Will Stevens, Times Herald, Vallejo, Calif., second.

First prize in feature articles went to Jack Foisie, San Francisco Chronicle.

'Mothball' Breathers Prevent Corrosion

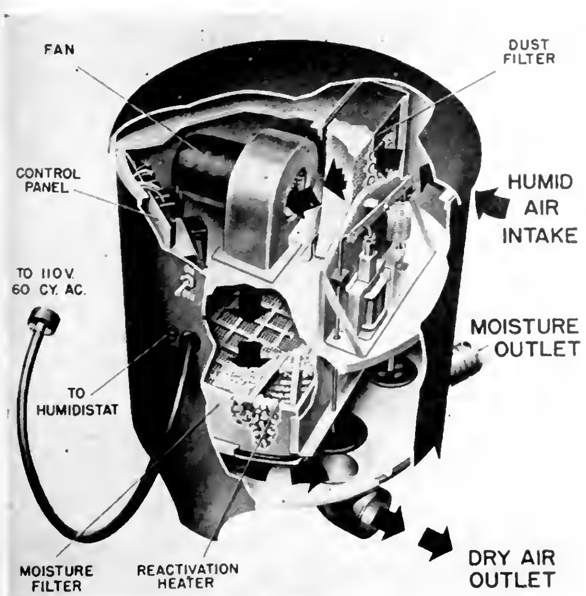
Thousands of tiny electric fans are serving as the lungs of many ships in the Navy's "mothball fleet". These three-inch blowers, made by the Sturtevant Division of Westinghouse, Hyde Park, Boston, Mass., are part of dehumidifying systems installed aboard the inactivated ships to prevent corrosion in sealed-off compartments.

Without such precautionary measures, corrosion would result from moisture condensing on exposed metallic surfaces, it was explained by J. C. Thompson, the division's sales manager. The complete drying apparatus is made by the Dryomatic Corporation of America.

The fan in each unit circulates air in the sealed-off compartment through silica jell, a dehumidifying material, until the air's humidity has been reduced to 30 per cent or less. This point is low enough to prevent rust, Mr. Thompson said.

The dehumidifying process is interrupted when the silica jell has trapped all the water vapor it can absorb. Then, the fan helps dry the jell so it will be able to absorb moisture again when the drying process is resumed. The fan brings in air from the outside, and after being heated, the air is passed over the silica jell, thereby drying it.

Whenever the compartment's humidity rises above 30 per cent the apparatus goes into operation automatically and repeats the drying process. More than 4,000 such units are in operation.



Devaluation

(Continued from page 57)

amount to over 44%. The British importer who paid approximately 5 shillings for the dollar will now have to pay over 7 shillings, and this will tend to curtail purchases in the United States.

Effect on Shipping

American enterprises engaged in the transportation of goods by land, air or sea are in the fortunate position of being engaged simultaneously in exports and in imports, and the loss in export trade may be compensated by the increase in import business. Our transportation industry has been benefiting from our increased foreign trade. Our foreign trade volume expressed in dollars is now about three times greater than prewar level. While the actual tonnage has not increased in the same ratio, the traffic is much larger than before the war. It is estimated that about 10% of our railroad traffic constitutes shipments to and from ports and destinations across our borders.

Our ocean borne traffic may, however, be adversely affected by the devaluation of foreign monies. Exporters and importers in European and other countries will have to pay more for ocean-freight on American Flag steamers and there will be a tendency to switch to foreign flag ships. I understand that the Maritime Commission is undertaking a complete survey of how the currency devaluation will affect ocean shipping rates. The study will give particular attention to the question of whether devaluation will give foreign lines any undue advantage over American shipping. The study will also cover conference agreements. American exporters who will now have to compete with cheaper European prices will feel the effect of lower European ocean freight rates. These exporters may seek freight rate adjustments.

Since the end of the war, the United States embarked upon a policy of helping and strengthening other nations. We expended huge sums in lend-lease and other military assistance and our post-war aid has so far exceeded 33 billion dollars. We contemplate additional aid through our European Aid Program, Military Assistance Program, etc. We are, therefore, vitally interested in the measures adopted by the European nations to solve their monetary and trade problems. If devaluation will enable European countries to sell more goods to us and to earn the dollars for their needed purchases in the United States, it will eventually benefit American business. If the measure succeeds, we may eventually be helieved of the burden of foreign aid expenditures which are taxing our economy.

Too Many Controls

Normal trade between nations will, however, not be restored while such trade is still hampered by a maze of government restrictions and controls, while a merchant in a foreign country must obtain his government's permission to buy or sell abroad, to receive or to pay money, or to enter into any transaction with a merchant in another country. The devaluation of monies will be of little help if government controls and barriers will continue to stifle international commerce.

Corrosion causes an annual loss of about two percent of all the iron and steel in use throughout the world, the U. S. Department of Commerce reports.

Dema's Marine Diesel Panel

Diesel Engine Manufacturers Association is providing a Diesel Panel for the American Merchant Marine Conference during the week of their Annual Meeting in New York in October.

The program will deal with the application of Diesel engines in the marine field. The program as set up at the present time will include the following:

Chairman:
Robert H. Morse, Jr. of Fairbanks, Morse & Co., President of DEMA.

Co-Chairman:
A. W. McKinney of The National Supply Co., Vice-President of DEMA.

Speaker:
P. A. Christensen, Pres. Burmeister & Wain American Corporation, 35 West 53rd Street, New York.

Subject:
"What is Being Done In Europe With Diesel Engines in Cargo Vessels."

Speaker:
Capt. F. C. L. Dettman, Head Diesel Div., Bureau of Ships U. S. Navy, Washington 25, D. C.

Subject:
"The Use of Diesel Engines by the Navy."

Speaker:
Prof. L. A. Baier, Head Naval Arch. & Marine Engrg. University of Michigan, Ann Arbor, Michigan.

Subject:
"The Use of Diesel Engines on The Great Lakes and Inland Waterways."

Speaker:
Stanley LeCourt, Res. Engr. Mississippi Shipping Co., 1300 Hibernia Bank Bldg., New Orleans, La.

Subject:
"Recent Experiences with the Operation of Diesel Vessels."

Speaker:
Richmond K. Kelly, Vice-Pres. Tide Water Associated Oil Co., 17 Battery Place, New York 4, New York.

Subject:
"Our Experience in Operating Diesel Tankers."

Million Dollar Seamen's Club

A million dollar Seamen's Club was opened October 3 in Mobile, Ala., under the direction of George E. Blacktopp. The Club's convenience and appointments are exceeded by few hotels in America. It boasts 83 sleeping rooms, a main lounge, library, chapel, game room, coffee shop, soda fountain, bar, barber shop and sun deck. There are suites and apartments for wives and families of seamen. The Club is air conditioned throughout.

Services include stowage of gear and handling of mail while seamen are at sea, safekeeping of money and valuables, and a personal affairs service.

The $1,100,000 to build the club was contributed by firms and individuals located throughout the United States. The Club will be entirely self-supporting from room rentals and service charges.

Singing Propellers

(Continued from page 37)

occluded air in way of thick or square trailing edges.

It is quite probable that some propellers could be noisy because of thick edges, and at the same time because of operation at low slip ratio. The former can be easily overcome and in most cases, although annoying, is usually not very harmful. The latter is a warning that should not be neglected since the propeller is vibrating vigorously, and eventually the stern bearing will wear down and the shafting will become fatigued if the condition is allowed to exist.

To Recapitulate

We have found that when operated at low slip ratios, propellers with ogival or airfoil sections become eroded on the driving faces of the blades and vibrate to an extent depending on the slip ratio. Also such propellers, when operating at high slip ratio, become eroded on the backs of the blades, but give little or no trouble with regard to vibration. In addition, we find that when operating at low slip ratios the Airfoil propeller, made similar to Taylor's Group (C) sings, while the ogival propeller does not; at high slips neither type sings. The ogival propeller was mass balanced while the airfoil was not. Prof. Burrill's experiments have shown that certain airfoil propellers were changed from "singing" to "silent" by changing the blade shape so that they were mass balanced about a central axis. When not mass balanced they vibrated about the leading edge whereas when mass balanced the vibration at the trailing edge was probably much less violent than before. Mass balance seems to have been equivalent to a stiffening of the trailing edge, for he found such propellers to be silent in service. It is not stated whether any attempt was made to discover if these propellers were operating at the correct slip in service. We believe it possible, indeed quite likely, that if operating at low slip they might still be vibrating although the vibration has become inaudible.

Many of our Airfoil propellers sang in service but became silent immediately after the dimensions had been changed so that they operated at maximum efficiency, and none of them were in mass balance. In such cases the "clapper" of the bell had been removed.

It has been shown by experiment that one type of propeller blade, when caused to vibrate, will do so more easily and more vigorously than another.

By actual use of both, we have found the only ogival or Airfoil propellers to be free from vibration and erosion, are those that operate at exactly the slip which corresponds to maximum efficiency, and also have proven to ourselves, at least, that such propellers do not sing.

Consequently we believe that if one particular type of section may be shown to be more efficient than another, then it can be used without fear of being noisy, provided the proper dimensions are selected.

Part II will follow in the November PACIFIC MARINE REVIEW —Ed.

The Tuna Clipper

(Continued from page 45)

gear rather than a super-charger. The cost would not be very much different. By turning the engine a little faster than originally intended and using a 2½ to 1 reduction gear, a very efficient propeller RPM of 240 would be obtained. The result would be a greater effective horsepower at the propeller and more speed, and a lower fuel consumption for the engine. Only a few years back the tuna fisherman trusted nothing but a slow speed heavy duty engine, but now that the lighter medium speed diesel engines have proven themselves in the new tuna clippers and since the "Sherry Ann" has been operating with a reduction gear for 2½ years already, the owner was readily convinced. The engine he finally chose weighed less and was smaller than the one originally considered, allowing more space in the engine room. The reduction gear is a 2½ to 1 inline type gear with an integral thrust bearing and is located aft in the shaft alley just ahead of the tailshaft coupling. This arrangement makes for better distribution of the machinery weight and gives a better balanced boat. About 1500 pounds of shafting weight is saved because of the two inch reduction in the size of the high speed intermediate shaft. The regular thrust bearing mounted on the engine could have been left off with another saving in cost and space, but the boss thought it should be kept a standard marine engine, and besides, he argued, in case the reduction gear ever *did* break down, it could be lifted out and a stub shaft bolted in its place to get the boat home in an emergency.

Rodman Represents Kieley & Mueller In N. California

Hugh Rodman, 270 Fremont St., San Francisco, has been named Northern California sales representative of Kieley and Mueller, Inc., manufacturers of marine boiler room control valves.

The Northern California territory under Rodman consists of the area north of and including counties of Mono, Madera, Merced, Santa Clara and Santa Cruz. In Nevada the territory includes Mineral, Lyon, Douglas, Ormsby, Storey and Washoe counties. Establishment of a representative in Northern California is a part of the company's plan to strengthen its distributor organization throughout the country, and to provide this part of the West Coast with a larger, more specialized organization.

Rodman has a wide background in control systems and control equipment. He was for many years associated with Universal Oil Products Co. in Chicago, and more recently, with the Bushnell Controls Company in San Francisco.

New Boiler-Tube Welding Process

A new and simpler process for welding boiler tubes, which effects a large saving in time, has been developed at the Chattanooga, Tenn., plant of Combustion Engineering-Superheater, Inc.

In many large modern boilers continuous tubes of lengths in excess of 100 feet are required, and to make them it is necessary to join two or more commercial lengths of tubing. The tube joints must have as much strength as the tubes themselves, in accordance with safety and boiler code requirements.

The principles of induction heating and pressure welding are both employed in the new process which is used to make tube joints. A high frequency generator supplies power for the induction coil, the heating from which serves in effecting a pressure-type weld. A feature of the new apparatus is an enclosed atmosphere to protect the welding surfaces against oxidation during the heating period.

Both straight and bent tubing may be welded by this method, which is expected to be less expensive and more uniform than hand welding and avoids the complications of internal cleaning that is required when flash welding is used. By combining induction heating and pressure welding, pressure-type welds may be made without objectionable upsetting of metal in the welding zone.

Tubes, drum hangar rods, and headers may be welded by this process, which is capable of handling materials ranging from 1 in. to 10 in. in diameter. Actual welding time is but a few seconds, depending upon the size of material. The use of backing rings is avoided, and welds may be made of one alloy steel to another or of alloy steel to carbon steel.

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The details of new equipment or the new literature announced in this department will be furnished without obligation on your part. For quick service, please use this coupon.

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Aluminum Alloy Accommodation Ladder

Safety-minded tanker operators will be interested in the 45-foot Waco aluminum alloy accommodation ladder recently designed and fabricated for the Sun Oil Company by Washington Aluminum Company of Baltimore.

Waco aluminum accommodation ladder designed and fabricated for Sun Oil Company by Washington Aluminum Company of Baltimore.

Outstanding safety features are the compensating aluminum hand rails and the rotating upper platform with 180-degree turn, allowing the ladder to adjust automatically to shifting movements and positions of the ship at dock so as to provide a dependable foot-and-hand-hold at all times. Accident-preventers also are the deep-grooved feathering treads, carborundum filled to give a permanent non-skid surface. All moving parts of the ladder are of stainless steel bushed with Micarta to prevent jamming and to insure ease of operation.

Special fittings make it easy to attach this spark-proof aluminum ladder to a vessel at any position along its length.

Good Copy

September 12, 1949

Mr. T. D. MacMullen, Editor
PACIFIC MARINE REVIEW
580 Market Street
San Francisco, California

Dear Mr. MacMullen:

Because your publication has carried our series of industrial advertisements known as "The Standard Engineer's Case File" and "The Standard Engineer's Report," we thought you would be interested in knowing that the series has won second prize in a national selection made by the Industrial Advertisers Association.

Basis for the award was "For the campaign which in

the opinion of the Judges is of outstanding excellence in its planning and execution." First prize went to the Rubberset Company for a series of double-spread advertisements with exceptionally well-developed copy.

This was the first competition in which our industrial advertising had been entered. The combination of the advertisements and the media used has brought us outstanding results.

The series appears in 44 publications in 13 industrial fields, both regional and national. The approach is unusual, with the copy closely tailored to each field.

Cordially yours,
M. A. Mattes
Manager, Advertising Dept.
Standard Oil Company of California

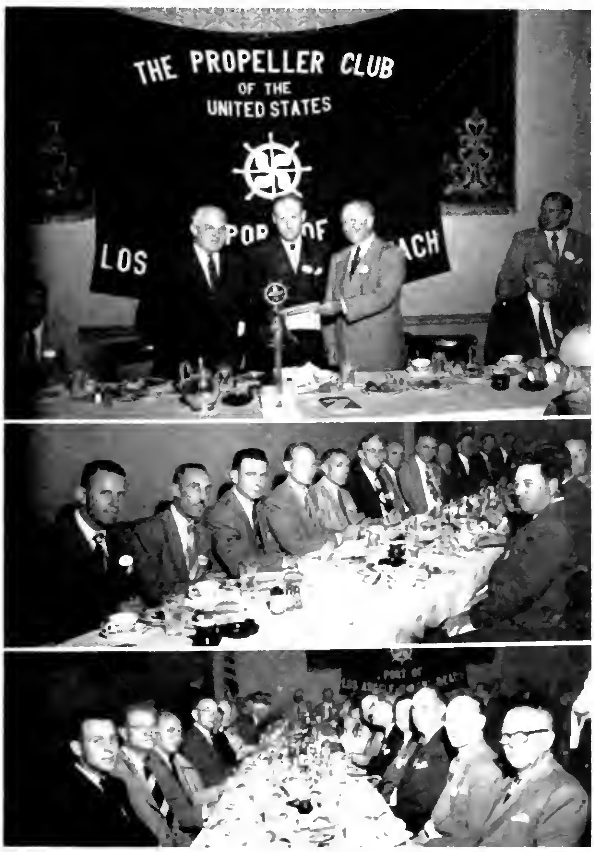
L. A. Propeller Club

The recent Propeller Club nation-wide journalism competition produced winners in Los Angeles and San Francisco. These pictures were taken at the Los Angeles meeting at which D. L. Darsie of Los Angeles Herald-Express was honored.

Top, left to right: Mayor Fletcher Bowron; Norman E. Dunnavand, President; Darsie L. Darsie getting Propeller Club Award.

Center. Included in this picture: A. B. Herbold, Crescent Wharf & Whse. Co.; C. H. Friederichsen, U. S. Customs; David Guntert, Richfield Oil Corp.; Thomas C. Cook, Richfield Oil; R. T. Robertson, Los Angeles Fire Dept.; Graham Polk, Time Oil Co.; Frank Higbee, Harbor Dept.; A. L. Haggard, Time Oil Co.; R. Kingsbury, De La Rama S.S. Co.

Bottom. Included in this picture: Bill Irby, Fireman's Fund Ins. Co.; Martin Faerber, American Pacific S.S. Co.; Mark Overton, R. C. Griffith Co.; Comdr. William A. Mason, USN (ret.); C. M. Boyd, Catalina S.S. Line; Capt. A. P. Brown, Todd Shipyards; W. A. Kane, Todd Shipyards; Roy Abbott, Moore-McCormack; A. P. Smith, Moore-McCormack; C. N. Perkins, Attorney, Los Angeles Harbor.



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Pacific MARINE REVIEW

NOVEMBER 1949

Pacific MARINE REVIEW

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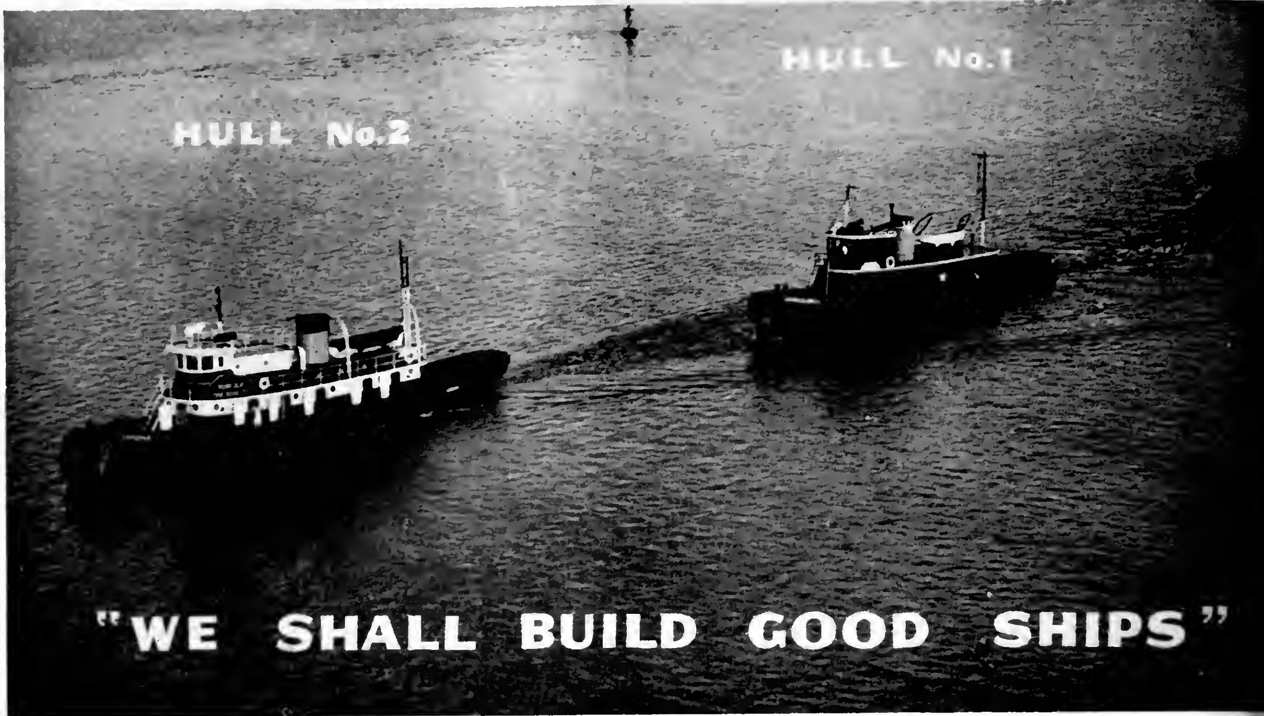


1891 — 1949

FIFTY-EIGHT YEARS OF SERVICE

Newport News Hulls No. 1 and 2 built in 1891 are shown on September 28, 1949, in the waters of their birth, Hampton Roads. After fifty-eight years of service both vessels are still working daily. Hull No. 1, formerly the DOROTHY, is now the J. ALVAH CLARK of the Wood Towing Corporation. Hull No. 2, formerly the EL TORO, is now the VIRGINIA of the Norfolk Dredging Company.

These two vessels are further operating evidence of the fulfilment of the policy established by the Newport News Founder, Collis P. Huntington: "We shall build good ships here at a profit if we can at a loss if we must, but always good ships."

NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY

NEWPORT NEWS, VIRGINIA

The Changing Maritime Picture

ONE obscuring factor in the changing maritime picture has been too many statistics. For instance, the comparative slump in shipbuilding, and the slump in ship movements, and the slump in cargoes. Are they really what they seem? We think not, for there will be more ships built in the postwar decade than in the prewar decade; ship arrivals may be fewer, but on their routes they are larger and faster; and the cargo figures usually exclude tanker cargoes and those carried in Army and Navy ships to lands which were once prime trading areas, and will be again.

A ton of cargo—what is it? Prewar, a ton might be of steel, measured in pounds, or cotton, measured in cubic feet. Postwar, the steel may be in a machine, measured in cubic feet, and the cotton be in fabrics, measured in pounds. No comparison is valid.

Intercoastal traffic is down from prewar, but can bounce back with the resolving of such matters as suitable vessels, canal tolls, and depressed rail rates. There may be solutions in process for each of these.

Passenger traffic, it is said, tends toward the airplane. Is this really proven? Essential, or defense, types of aircraft attaining supersonic speeds may far exceed acceptable passenger speeds, leaving the latter uneconomical without tremendous subsidies.*

There is certain unanswered criticism of the Maritime Commission. It is only fair to point out that of all Government departments, the Maritime Commission alone is forbidden to spend any of its funds for publicizing its affairs. Its critics, in and out of office, remain unanswered and the Merchant Marine remains unjustified in the public mind. Chairman Fleming and Judge Bland may be able to correct this.

The lay-up fleet, even to some shipping men, represents a public waste. But by-passing the "They won the war" cliche, is it not a fact that the reserve ships are about the only tangible thing we have left for the war-billions spent? Let's not deprecate our lay-up fleet. It would have saved many lives seven years ago.

The horizon seems to be lifting on our view.

The postwar muddied picture is not peculiar to the maritime industry, whose delayed solutions may be stronger for the delay. There is satisfaction in the important place the merchant marine and world trade occupies in the present world scene. The prosperity of United States industry is largely attributable to our export totals. And those export totals are expected to be the instrument for building a more prosperous and peaceful world.

The confused postwar maritime picture is clearing. The new scene will be a more satisfying one.

*We expect to enlarge on this point in an early issue.

"W. R. Grace"
Painting by Charles R. Patterson

The Story of Grace Line

ALMOST ONE HUNDRED YEARS AGO young William Russell Grace set sail from his native Ireland for the distant lands of South America. Peru, in particular was his destination. In late 1851, young Grace had settled in the small port town of Callao where he joined the ship's chandler firm of John Bryce. This was the beginning of an association of many years' standing and the forerunner of what is now known throughout Latin America as Casa Grace.

The young man liked the shipping atmosphere, liked the chance to aid his employer who was not averse to listening to suggestions for broadening the scope of activities. At the suggestion of the youthful apprentice, Bryce decided to enter the rich guano trade. Guano was the richest source of fertilizer then known and was found in huge quantities on the nearby Chincha Islands. W. R. Grace anchored a supply ship off the coast of the islands and the Bryce company was in a new and successful business.

In 1868 the company became Bryce, Grace & Co. with W. R.'s brother Michael as the working partner. In the meantime William Russell Grace had come to New York where he started an import-export concern. As a trader, Mr. Grace imported to the United States many of the products of the West Coast of South America: coffee, bananas, nitrates, and, of course, guano.

The genesis of the Grace marine transportation system occurred in those years when Bryce, Grace & Co. was finding the guano trade extremely satisfactory. In the 1870's the company entered the South American trade with a fleet of sailing ships, among them the *M. P. Grace* and *W. R. Grace,* the two fastest ships sailing from South America, via Cape Horn, to the United States.

The *W. R. Grace* made many trips around Cape Horn until she was finally beached off Lewes, Delaware, in 1882 on returning from her last voyage to England.

In 1894 Grace made its advent into the hemispheric shipping world. All down the intervening years Grace ships have been closely identified with the development of trade routes between North and South America.

For generations the Santas and their earlier counterparts—luxury liners as well as the combination cargo-passenger vessels—have played a vital role in furthering inter-American commerce. Increased exports and imports among nations have always been the shipper's paramount concern. To attain this objective Grace Line has maintained a continuing two-way program: a forward-looking, enterprising policy of route expansion, coupled with a real desire to encourage the development of mining, agriculture and industry. In 1894 the *Coya* and three other ships of 4600 tons began regular runs between the United States and the West Coast of South America. The company's first vessels were twice the size experts had claimed were needed for maximum efficiency, but even at that they were soon discovered to be too small to handle the cargo with the increased demands of trade.

Known in those days as "The Merchants Line", the service covered the West Coast as far north as Guayaquil. As time went on, the countries on its route enjoyed such

W. R. Grace
Founder of Grace Line

Left to right: Daulton Mann, Mrs. Edward T. Ford, Mrs. Mann, Capt. Curt Zastrow and E. T. Ford.

Mr. and Mrs. Mann saw Mr. and Mrs. E. T. Ford off when they sailed on the maiden voyage of the new Grace Liner "Santa Rosa" on Nov. 26, 1932 for San Francisco. Mr. Ford was president of the Grace Line's New York-California Service.

J. P. Grace, Jr.
President of W. R. Grace & Co.

an upswing in copper and tin mining that with the wider use of nitrate of soda for fertilizer in the latter decade of the nineteenth century, greater freight loads placed ever-increasing demands on the ships of the line.

In 1912 the Atlantic & Pacific Steamship Company was founded to answer the need for freight service between Atlantic and Pacific Coast ports. The line operated four ships down through the Straits until the Panama Canal opened.

After the opening of the Canal, direct service to the west coast was inaugurated by Grace Line's *Santa Clara* in 1918. The *Santa Clara* was the first ship to pass through the formally opened Panama Canal. At the close of World War I, the company bought several ships from the government and began fortnightly sailings on this route. The *Santa* fleet then included the *Santa Luisa, Santa Theresa, Santa Elisa* and *Santa Ana.*

With the added trade stimulus of the Merchant Marine Act in 1928, larger and more sumptuous vessels were acquired by the Line, among them the then-new *Santa Clara, Santa Barbara* and *Santa Maria,* culminating in 1932 with the four luxury liners, the *Santa Rosa, Santa Paula, Santa Elena* and *Santa Lucia.*

During all this time Grace was branching out and expanding its service in other directions. It controlled the Pacific Mail Steamship Company, with routes to the Far East from 1915 to 1925. In 1921 it inaugurated a new passenger-freight service between New York and San Francisco calling at Several Central American ports. After 1925 its Panama Mail SS Co. maintained fortnightly sailings with operation of four 13-knot. 100 passenger ships. This was the first direct service to New York from Central America. In 1928 its ships connected California and east coast Colombian ports for the first time.

This service was changed to Grace Line, Panama Mail Service between 1931-32. For a number of years the four famous sister ships were on this run. The *Santa Paula,* in fact was, the first vessel to pass under the newly constructed Golden Gate Bridge in San Francisco harbor.

In 1937 Grace Line purchased the Red "D" Line. In February 1938 it expanded once more with the purchase of the Colombian Line. It was in that year that the *Santa Rosa, Santa Paula* and *Santa Elena* began the Caribbean run and the *Santa Lucia* became the flagship on the New York to West Coast of South America route. The Caribbean cargo service was initiated with freighters which served Venezuela, The Netherlands West Indies and Colombia.

Although its beginnings go all the way back to the days of the clipper ships, the North Pacific Division of Grace Line has been in regular service only since 1903. Since then a constant stream of trade has been flowing between the lumber ports of the Northwest and the Chilean nitrate ports to the south with frequently as many as fifteen stops between terminals. Extra ships were chartered during the coffee season in Central America in order to handle the heavy freight loads. A few of the vessels in this service before the war were the freighters *Cuzco, Coya, Capac, Condor, Charcas* and *Chipana.*

In addition there was the Nosa Line, first to offer direct service between the Gulf of Mexico and South America's west coast. This was established in 1918. Some of the ships were the *Nosa King, Nosa Queen, Nosa Prince* and *Nosa Chief.* During the Line's reorganization in 1931-32, the Nosa Line became an integral part of Grace Line.

Grace Line ships have won fame in both world wars because of the crucial role they played in each instance as an essential part of the United States total naval power. At the time of World War I, for instance, Grace

R. Ranney Adams
President, Grace Line Inc.

Line had 150,000 gross tons of shipping, exclusive of charters, all of which was under government control. Two ships, the *Cocore* and *Cacique* were lost through enemy action. A German U-boat cornered and sank the *Charcas*. The *Chincha* was handed over to the Italians for war duty and the great explosion at Halifax destroyed the *Curaca*.

When the *Santa Ana* sailed from a Brooklyn pier in the midst of World War I. bound for South America to inaugurate the *Santa* fleet, she was promptly taken over for war service. She and her sisters, also requisitioned by the United States government, were each capable of carrying 5400 tons of cargo and 100 passengers.

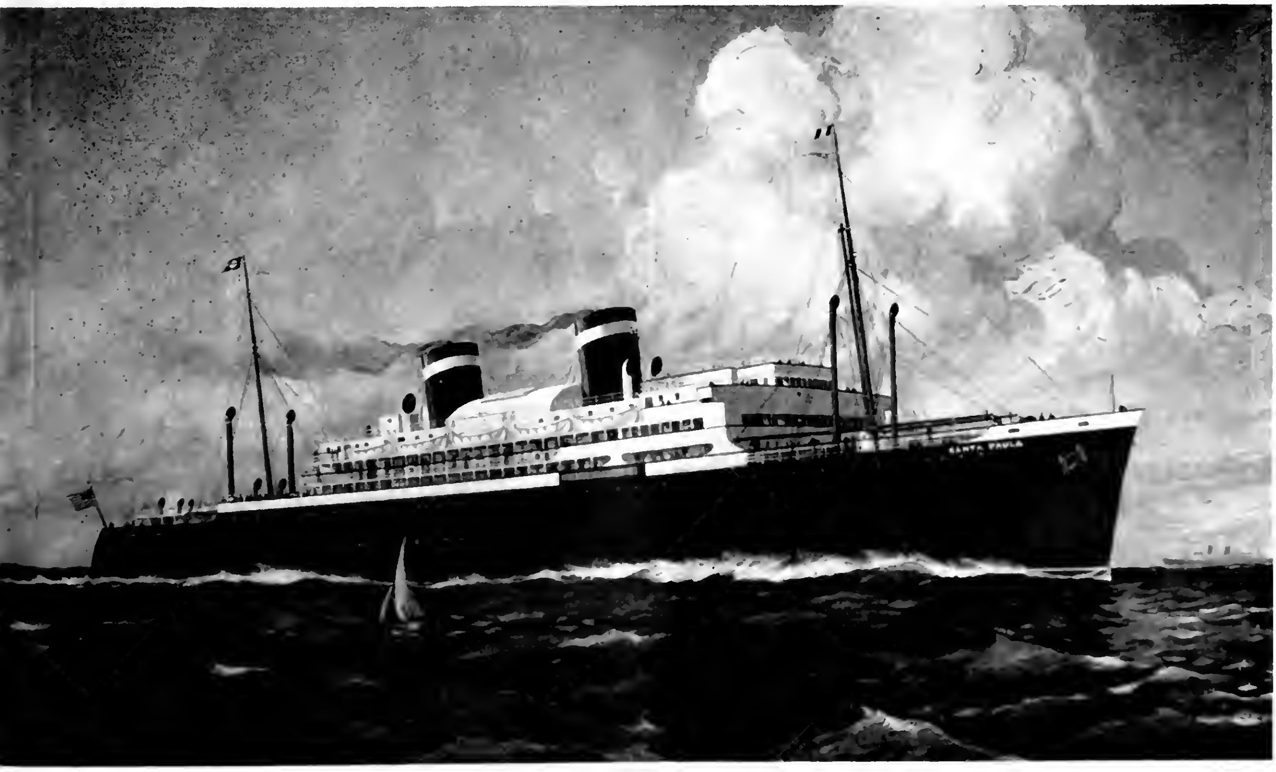
Before the outbreak of World War II the four famous sister ships, *Santa Rosa, Santa Paula, Santa Lucia,* and *Santa Elena,* had been regular visitors to ports on the Caribbean since they began their service to South America in the early 1930's. Besides acting as commercial links between the countries at whose ports they called, the *Santas* served also as ambassadors of good will until the war put an abrupt end to normal shipping.

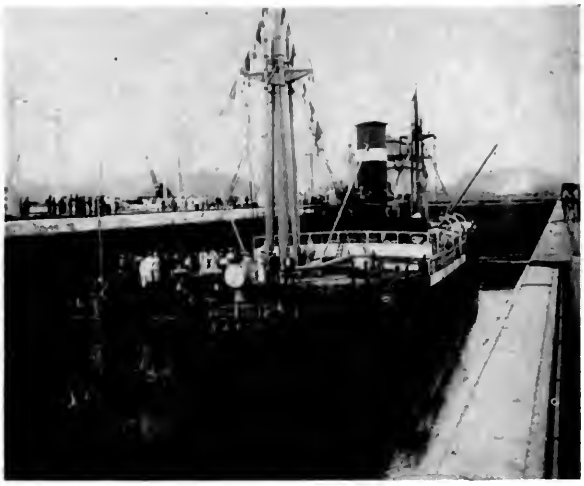
Designed expressly for cruising in the tropics, the famous sisters were built by the Federal Shipbuilding and Drydock Co. in Kearny, N. J. At the time the keels were laid, however, war clouds were already looming on the distant horizon, so into the *Santas'* blueprints went the Navy's requirements for ships suitable for quick conversion to troop transports. When war broke out they were naturally among the first to be summoned into service. Worth remembering and a point to be considered in future maritime planning, is the fact that in 1941 there were less than two dozen passenger liners flying the United States flag completely equipped for rapid conversion to naval auxiliaries.

Godfrey MacDonald
Vice President and General Passenger Traffic Manager of Grace Line, Inc.

The *Santa Paula,* today once again the sleek, luxurious pleasure cruiser, had a valiant and hazardous war career.

A painting of Grace Line's "Santa Paula".





"Santa Clara", first through the Canal.

Actually she began her war service a week before Pearl Harbor. Under top secret orders she sailed to West Africa with 500 aviation technicians and 2,000 tons of supplies aboard to establish the air ferry bases that were later to prove so essential to our victory. News that the United States was at war reached her at sea. She was no longer a neutral ship when she arrived at Dakar.

Dr. Goebbels' broadcasters, announcing her mission and whereabouts over the Berlin radio, boasted she would never return to America. For four and a half years after that she continued to worry the Axis forces on many fronts. She would have been a real prize for Raeder's submarines or Goering's air force if she had been caught and sunk, but despite Dr. Goebbels, she remained very much afloat, and a continuing force in the battle for victory.

The *Santa Paula* was off Casablanca on Invasion Day-plus-3 with 2270 combat troops. She was in the first convoy to hit Palermo in the assault on Sicily, and watched her not-so-fortunate sister, the *Santa Elena,* mortally wounded 800 yards ahead in a torpedo plane attack. The *Santa Elena* sank as she was being towed into the harbor of Philippeville, Algeria.

As the Allies launched assaults against the continent and began pouring troops into Europe to support the invasion, the *Santa Paula* went into regular shuttle service between the United States, England and Europe with one interruption—a four-month mission to the Red Sea and Persian Gulf. She came through the war with an enviable record. Final tally showed she covered 237,000 nautical miles carrying thousands of tons of military supplies and more than 100,000 combat troops, wounded, prisoners of war, Red Cross personnel and civilians on military and naval assignments.

Meanwhile the *Santa Rosa* was equally busy. Shortly after Pearl Harbor when shiploads of American GI's were streaming into such faraway unknown ports as Noumea and Bora-Bora, the *Santa Rosa* joined in the initial troop movement to the South Pacific. Shortly afterward she turned up halfway around the world in the Near East with troops and supplies to halt Rommel's advance on Egypt.

In the vanguard of the invasion of North Africa and the Sicilian landings, she later anchored off St. Tropez discharging troops during the invasion of France.

Between times, she shuttled across the Atlantic from the United States to England, North Africa and Europe, winding up with a mileage and passenger total almost identical with that of the *Santa Paula.*

The *Santa Lucia,* fourth sister of the famous quartette, saw service as a Navy transport. Rechristened the *Leedstown,* she was sunk in the early stages of the North African invasion.

Although two of the famous foursome among luxury liners were lost in action, their memory lives on and is evoked most vividly whenever one or the other of their sisters is seen upon the seas.

After the Japanese surrender, the Navy released the *Santa Paula* and the *Santa Rosa,* leaving them free to pick up their once-familiar Caribbean routes. It was not so simple as that, however. It would take some time to convert the big liners back to peacetime use.

The *Santa Rosa* entered the yards of the Newport News Shipbuilding and Drydock Company in May, 1946, for large scale reconversion. It was followed in July of the same year by the *Santa Paula.*

After years of gruelling war service when speed was of the essence and there was no time for any but the most necessary of repairs, considerable reconversion work had to be done.

A major problem in the reconversion involved the stripping of the various wartime disguises. Guns and gun platforms had to be removed, life rafts and standee bunks done away with. Cafeteria equipment had to go also and, of course, the dress of wartime grey.

Once these were gone, back aboard the Santas went the mass of equipment and accessories that make possible the miracle of modernizing and renovating. Regardless

The "Santa Rosa" on her first entrance to San Francisco Bay. In this fine old-time view of the Bay, nine ferry boats appear.

Grace Line's "Santa Isabel" at dock at Valparaiso, Chile.

of how complete a job was done, however, there will always remain such telling reminders of the days of the war, as an occasional GI's initials of those of his best girl nostalgically carved on deck or rail.

But there was more to the task of reconversion than just putting Humpty-Dumpty together again. Into the refitted *Santas* builders were careful to put newness of design without sacrificing the ships' familiar charm. Every effort was made to retain the original attractiveness of furnishings and decorations, while at the same time making use of the many modern improvements in design and construction.

The job of refitting a cruise liner entails not only the items necessary to the operation and navigation of the ship, things the passenger never sees, but a raft of items for public rooms, cabins and galley.

To renew and refurnish the two ships from the engineroom to the bridge, from cargo hold to storeroom, cost approximately $2,500,000 apiece. Each took about ten months to complete.

The *Santa Rosa* and *Santa Paula* are sisters in every respect, and though the engineroom set-up is known to many who have sailed the ships at one time or another, a short resume may be of interest.

They are twin-screw vessels, the main propulsion units consisting of two sets of cross-compound double-reduction geared General Electric turbines. Each set is capable of developing 6600 shaft horsepower at 98 rpm of the propeller shaft, giving the vessels a speed of 18.5 knots.

Steam is supplied by four A type boilers which are provided with superheaters and economizers, the boilers delivering steam at the superheater outlet of 400 psi gauge and 750 degrees F. The boilers in the *Santa Rosa* are Babcock & Wilcox and the boilers in the *Santa Paula* are Foster Wheeler.

Each turbine unit exhausts to an individual condenser of the two-pass type, each of the two condensers having approximately 6000 square feet of cooling surface.

There are two main feed pumps and one port feed pump, one main feed pump being motor-driven through reduction gears, the other being turbine driven. The port feed pump is motor-driven through reduction gears.

For furnishing electric power for auxiliaries and current for lighting, etc., each vessel is provided with two 500 kw. and one 200 kw., 240 volt direct current compound-wound, independent generators, all generators being driven by G. E. turbines through reduction gears. There are also two 500 kw., 240 volt D.C. shunt-wound generators attached through a flexible coupling to an extension on one of the low speed pinion shafts of each gear train. Under normal operating conditions at sea the total electrical load is furnished by the two 500 kw. attached generators. Arrangements are provided, however, so that the electrical load will be automatically transferred to the two 500 kw. independent generators when the speed of the propelling turbines falls below 70% of full speed. At sea, the independent generators are idling at all times.

To provide the necessary refrigeration for ship's stores and refrigerated cargo spaces, each vessel is provided with three CO_2 compressors capable of producing approximately 50 tons of refrigeration in 24 hours.

The vessels have an overall length of 508 feet, length between perpendiculars of 484 feet, breadth molded of 72 feet, depth molded 48 feet to bridge deck. Gross tonnage is 9238, net tonnage 3789 and displacement 17,000. The summer deadweight is 7121 at 25 feet 11½ inches.

Serving as express cargo craft as well as in their capacity of luxury cruise ships, six hatches and three side ports provide cargo entry. Number 2 is the largest hatch, measuring 29′6″ by 20′. One 50-ton and fourteen 5-ton booms serve the cargo.

Now in full operation in accordance with its original plans for postwar service, Grace was among the first passenger and cargo lines to achieve this position. With twenty-three owned and fifteen chartered ships, it is currently providing modern and frequent service over its traditional trade routes from the Atlantic and Pacific Coast ports to the north and west coasts of South America.

The Line's twenty-three owned ships are, of course, led by the two Famous Sisters, with the balance composed of nine combination passenger-cargo vessels carrying 52

"Santa Maria" leaving New York on her maiden voyage.

David N. Lillevand
Vice President in charge of Pacific Coast operations.

passengers each and twelve freighters with accommodation for 12 passengers apiece.

Three of the new combination ships are in regular service between New York, Colombia and Venezuela, including Maracaibo. The other six maintain weekly service between New York and the west coast of South America. Grace-owned freighters supplement the Caribbean and west coast South America service and, in addition, four operate from U. S. Pacific coast ports to Mexico and the west coast of central and South America. All of the services are further supplemented by Chartered ships, many of which are engaged in the important transportation of nitrate fertilizer.

All nine of the new combination passenger-cargo ships were launched in 1946 and in service by February '47. A modification of the United States Maritime Commission's C-2 type, carrying 52 passengers, their public rooms and staterooms are air-conditioned, all staterooms being outside with private bath or shower and intra-ship telephone.

Deck space aboard these ships is more than ample for promenading, sun bathing and deck sports, while an attractive tiled swimming pool is another unusual feature for ships of their size. Also included is an attractive verandah cafe, the glass doors of which can be rolled back when weather permits. Outdoor movies are shown on a large screen set between the king posts.

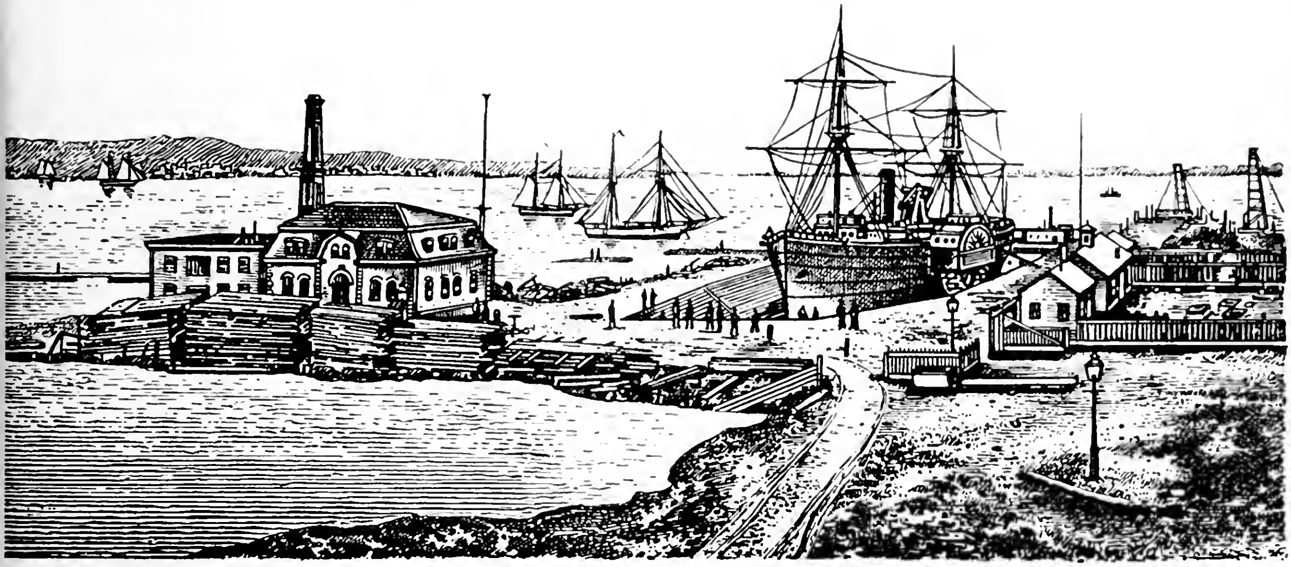
Other public rooms, located in the extreme forward part of the super-structure, consist of bar and cocktail lounge, dining room and salon.

These vessels, modern and compact, represent a new departure in ocean travel, and their frequent sailings allow wider choice of dates and greater convenience in making stop-overs during the voyage.

With these new passenger-cargo ships joined to the prewar fleet of cargo vessels and led by the Famous Sisters, Grace Line looks forward from its eminent position in shipping toward still greater commerce and closer relations with our Sister Republics to the South.

Fred L. Doelker
Long-time Vice President in charge of Pacific Coast operations, and now Pacific Coast Manager of Johnson Line, for which Grace is agent.

The C-2 "Flying Cloud", sistership of the "Stag Hound" which, like her famous antecedent, was the first of her type to enter San Francisco Bay.



Opening of Erie Basin Dry Docks, October 13, 1866.
S. S. "Morning Star," 2400 tons.

Todd's

- - - A Century of Ships and Shipyards - - -

TODD SHIPYARDS CORPORATION, with extensive and modern plant facilities for ship repair, conversion and construction at eight major ports of the United States and one port in South America, is one of the foremost firms of its type in the western hemisphere. In addition, the company performs industrial machining work at all of its shipyard plants, and operates a large Combustion Equipment Division. Today Todd maintains offices, shipyards and plants at San Francisco, Alameda, Los Angeles, San Pedro, Seattle, Houston, Galveston, New Orleans, Brooklyn, Hoboken and New York in the United States; Barranquilla, Colombia, in South America; and London, England.

Its Combustion Equipment Division at Elmhurst, Queens, New York, has designed, developed, manufactured and marketed a long line of gas and fluid oil-burning equipment during its 35 years of operations for marine and stationary use. This Division also manufactures and distributes TIFA—Todd Insecticidal Fog Applicator.

Home office for the Todd operations is at One Broadway, New York. Todd is represented abroad by a European representative in London, for shipyard and marine work, and by Todd Oil Burners, Ltd., London, and by Lister-Todd, Ltd., London. The latter manufactures TIFA, the Todd Insecticidal Fog Applicator, for sale in Europe and countries around the world in the sterling area. Todd also has marine agents in Norway and Denmark and an agent in Buenos Aires, Argentina, who handles products of the Combustion Equipment Division.

The Todd Shipyards Corporation traces the beginning of its organization to more than a century ago, when the era of wooden ships was dying and that of iron ships was growing apace. Captain John Ericsson, a brilliant young engineer who had made a name for himself in his native England, was induced to settle in the United States and he became closely associated with Cornelius DeLamater, young son of William DeLamater. This association proved of vital importance not only to Captain Ericsson and the DeLamater firm but also to the nation and the world at large.

The Propeller

For the engineer, Captain Ericsson, was a man of ability and vision who found an outlet for his genius in his association with the DeLamaters. Captain Ericsson was the man who invented the propeller, which the English Admiralty had condemned as impractical. Soon after his arrival in the United States in 1839 the first iron steamboat ever to be built in this country was authorized and Captain Ericsson was commissioned to serve as naval architect in its construction. He placed orders for the engines and the propeller with the DeLamater firm and the hull was constructed at the Navy Yard in Philadelphia. This vessel was named the *Princeton* and, with its propeller wheels and engines wholly beneath the water line, presented a design which was at once adopted not only by the United States but also by

John D. Reilly
President of Todd Shipyards Corp.

all other countries for naval vessels of the future. And, for what was probably the greatest advance in naval architecture, Captain Ericsson was paid the sum of $1150.

The "Monitor"

When the Civil War broke, the greatly expanded and improved DeLamater plant was ready to assume leadership in the industry, possessing large and well-equipped shops with special facilities for war work, and DeLamater offered them to the government for such work as might be needed. The younger DeLamater and Captain Ericsson conferred frequently on the problems then presented in naval warfare and, from these conferences, came the historic *Monitor*.

Keel of the *Monitor* was laid on October 25, 1861. The original contract called for completion in 100 days for the sum of $275,000. She had a length of 172 feet, beam of 41 feet, displacement of 1255 tons and a speed of nine miles an hour. The *Monitor* left New York Harbor on March 6, 1862 and arrived at Hampton Roads on the morning of March 9, and before the sun set that day the famous battle of the *Monitor* and the *Merrimac* was fought. A little known feature of that historic battle between the two naval warships was that the men who operated the boilers and the engines of the *Monitor* during the battle were the workmen from the DeLamater Iron Works who had built them, were familiar with them, and were paid by DeLamater. After the engagement they returned to the DeLamater works and continued their daily routine as if nothing untoward had occurred in their work-a-day lives.

The DeLamater Iron works, a forerunner of Todd Shipyards Corporation, was not only famous for the construction of the *Monitor,* but was also responsible for many of our modern conveniences. These included the first air compressor, developed by Captain Ericsson. The DeLamater works also built ice machinery, pumping equipment, boilers and gun carriages, and was one of the largest foundries on the Atlantic seaboard.

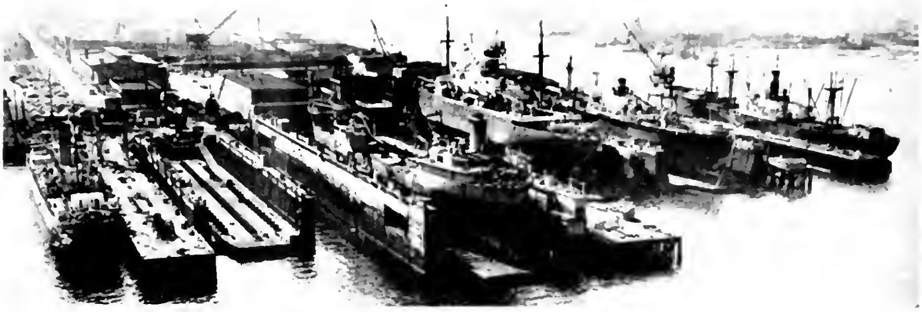
DeLamater took John Needham Robins, an employee of the DeLamater estate on Long Island, into the firm and taught him the marine building and repair business. Following several years of successful operations, acquisitions of properties, and changes in management, the firm became known as the Erie Basin Dry Dock Company, John N. Robins, Agent.

During this period William H. Todd, who had begun his career as an apprentice boilermaker at the Pusey & Jones Shipyard in Wilmington, Delaware, and continued it at the Brooklyn Navy Yard, became associated with the Robins organization. His ability and superabundance of ambition and energy resulted in rapid promotions and in eight years upon the retirement of Robins, he was selected to fill the company's presidency. When the Robins Dry Dock and Repair Company was formed in 1911, Todd continued as president of the new company. Then, in the autumn of 1915, Todd and his associates were offered an opportunity to purchase the entire capital stock of the Robins company. The William H. Todd Corporation was organized for the purpose of taking title to the stock of the Robins firm. Given six years in which to make payment, Todd and his associates paid off the capital stock purchase indebtedness in eight months time. Desiring to expand activities, Todd and his associates acquired the Tietjen & Lang Dry Dock Company of Hoboken, New Jersey, and the Seattle Construction & Dry Dock Company of Seattle, Washington, in 1916, and Todd Shipyards Corporation was formed to acquire from the William H. Todd Corporation all the stock of the Robins company and to acquire independently all the stock of the two other companies. Thus came into being the Todd Shipyards Corporation. With the death of Todd in 1932, directors of the firm elected John D. Reilly, who had started with Robins in 1907, as president.

The company has been guided over the years by men of courage and ability, and the foresight which they have displayed has spelled its story of advancement, achievement and success. The organization has grown steadily, step-by-step, as each of its leaders has built firmly and well on the foundations laid by his predecessors. From the days of William DeLamater, whose DeLamater Iron Works evolved into Todd Shipyards Corporation after 75 years of acquisitions and changes to John D. Reilly, the organization has established an enviable record in completing unnumbered thousands of shipbuilding, conversion and repair projects.

While the company now engages its efforts principally on ship repair and ship conversion work, over the years it has built new ships of all sizes and all types from ferry-boats to baby flat-tops. During the recent war, the firm

Todd's Seattle Yard.



repaired, converted and built 117,535,216 tons of shipping between December 7, 1941, and August 31, 1945. In 1362 working days, Todd's yards built 999 vessels including cargo ships, tankers, destroyers, LCI's and others. The amazing record, second to none, included repair, conversion or construction work on a total of 23,456 ships of more than 40 types in 11 Todd yards on all three coasts of the United States, with the Hoboken Division of Todd's leading the parade by handling 8228 vessels representing 33,859,056 tons.

Each of the company's yards has a comprehensive staff of marine architects, marine engineers and other specialists who work alone or with the ship operator's consultant, performing all details of work on a job from basic re-design and re-powering to the replacement, or the repair of the smallest fitting. During most of the thousands of years in which men have gone down to the sea in ships, ship repair work was approached from a somewhat individualistic standpoint—tasks were performed by the sailmaker or the carpenter. Now, however, the modern shipyard's foundation is laid in the complicated machinery in its shops and in the multitudinous types of up-to-date equipment required for precision work of major or minor nature, and it is founded in the minds of its trained supervisors and in the hands of its skilled workmen. Todd's yards are extensive areas, strategically located, possessing machine shops, traveling cranes, trackage, locomotives, piers, dry docks, and the numerous miscellaneous shops and buildings required to perform voyage repairs or thorough-going "modernization" of the largest type of ocean-going ships to the smallest harbor craft or fishing vessel.

A feature of Todd operations at all of its shipyards is the mobile service which it offers shipping interests. The company maintains, at each yard, rolling stock and equipment and the necessary number of supervisors and skilled craftsmen to perform emergency repairs on vessels at anchor or at dockside. This eliminates, for the

Todd's Alameda Yard.

Todd's Hoboken Yard.

ship owner when indicated, the movement of his vessel to a yard or dry dock, and saves him important time and costs.

Todd At San Francisco

Todd's San Francisco Division operates two facilities. One is the shipyard located at the foot of Main Street in Alameda, sheltered on the Oakland-Alameda Estuary, approximately two miles from the mouth of the Estuary; and the company's other facility is directly across the Bay on the San Francisco Embarcadero. The Alameda plant is a complete shipyard encompassing 25 acres. It has two dry docks. One has three sections, is 598 feet overall in length, 90 feet in width, and has a lifting capacity of 15,600 tons. The other has six sections, is 542 feet in length, with an 84-foot inside width, and lifts 10,500 tons. The Alameda yard has 10,150 feet of railroad trackage and 3403 feet of crane trackage. It has four piers, totaling 1914 linear feet, and piers 2, 3 and 4 are equipped with Gantry cranes. A wharf, 1,560 feet long, is also equipped with a Gantry crane. The yard has 23 production buildings covering 162,354 square feet, and warehouses covering 80,000 square feet.

The facilities on the Embarcadero in San Francisco include a pier of 1229 linear feet and 36,000 square feet of shops and buildings on Beale Street. The two facilities offer the usual Todd mobile service along the perimeter of San Francisco Bay and also far up the Sacramento River.

Todd At Los Angeles

Todd's Los Angeles yard covers 84 acres and is easily accessible from the Turning Basin at the head of the main San Pedro Channel of Los Angeles Harbor. This yard has two dry docks. One is in three sections, has an overall length of 598 feet, an inside width of 87 feet and a lifting capacity of 14,000 tons. The second has a lifting capacity of 10,000 tons. There are five wharves with berthing space totalling 6175 linear feet and ample buildings, housing shops, utilities and offices, and almost three miles of industrial trackage for the movement of heavy materials by locomotives and cranes. This yard, in addition to performing work on large ocean-going ships, and giving mobile service, is actively engaged in performing repair and conversion work on vessels of the large fishing fleet which operates in those waters.

Todd At Seattle

The company's division at Seattle is located at the

Todd's Houston Yard.

New Orleans Yard showing vessel in drydock.

northwest point of Harbor Island, next to and facing the principal anchorages in Elliott Bay, Seattle's harbor. It covers 30 acres and has seven piers totalling over 4350 linear feet. The yard has four dry docks. The largest has three sections, is 622 feet in length overall, 95 feet 2 inches inside depth, and has a lifting capacity of 18,000 tons. The other three docks range in lifting capacity from 5,000 to 16,000 tons. The yard's shops, utilities and offices cover more than 160,000 square feet of working space. An industrial railroad with approximately two miles of track serves the yard and is connected by a siding to adjacent tracks of the Northern Pacific Railroad. In addition, the yard has five Whirley-type cranes which can travel over 2940 feet of trackage. Mobile service at dockside is also available.

Todd At Houston

The plant at Houston, Texas, is geared to repair vessels of all types which use the fast-growing Houston port. The plant has a 3000-foot frontage on the Houston Ship Channel and 6,000 feet on Green's Bayou. Facilities include extensive pier and wharfage space, a full complement of utility and fabricating shops, and two dry docks. No. 1 dry dock has six sections, is 558 feet long, 84 feet wide, and lifts 10,500 tons, while the second is 351 feet long, 63 feet 3 inches wide and lifts 3000 tons. Both docks are served by 40-foot Gantry cranes with 35-foot radius. Mobile service is also available.

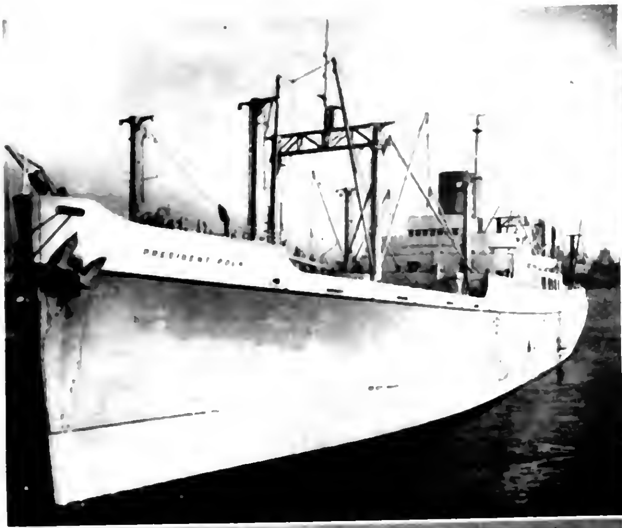
Todd At Galveston

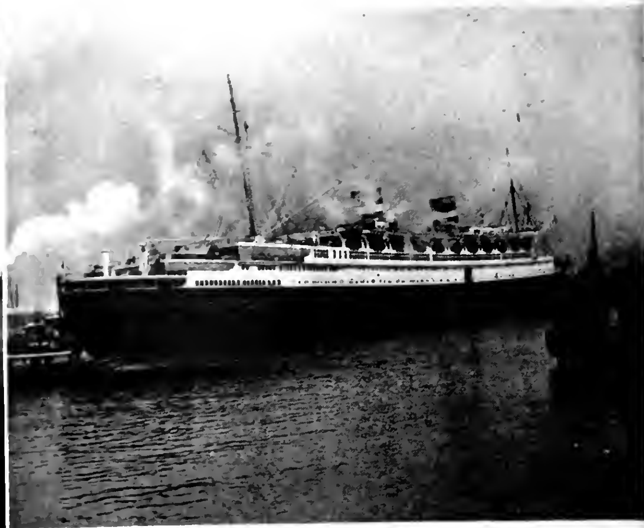
Sixty-one acres encompass the Todd Galveston Division on Pelican Island, on the north side of Galveston Channel close to the mouth of the Houston Ship Channel and near all Galveston wharves. Ferry transportation connects the yard with the heart of Galveston proper. The yard has four dry docks. The largest has three sections with an overall length of 614 feet, an inside width of 90 feet, and a lifting capacity of 15,000 tons. Two have a capacity of 11,000 tons each and the fourth can take vessels up to 1000 tons. The yard has five piers, totalling over 5400 linear feet, 32 buildings with floor area of more than 250,000 square feet, and more than 14,000 feet of industrial trackage.

Todd At New Orleans

The Todd-Johnson Dry Docks, Inc., operations at New Orleans consist of two plants, the "Upper" and the "Lower," and are situated on the Mississippi River next to the New Orleans Inner Harbor Navigation Canal, conveniently near all principal New Orleans wharves. The two locations cover 95 acres and the "Lower" plant has wharves totalling over 6600 linear feet paralleling the Mississippi River. There are three dry docks. The largest

A unique shipbuilding job gets under way at Todd's Galveston yard where two "upside down" ferry boats are being built. Here is the main deck. Keel will be laid on "top" last—and the whole thing turned over.





ABOVE: The 36,667 gross ton, Holland-America liner, "Nieuw Amsterdam" presents a pretty picture as she puts into the Todd Brooklyn Shipyard, aided by seven tugs, for a 48-hour weekend stay during which she had her bottom covered with 850 gallons of various marine paints. The 658-ft. vessel is the third largest in service coming to the United States and the largest that can be handled in a commercially-owned drydock in New York.

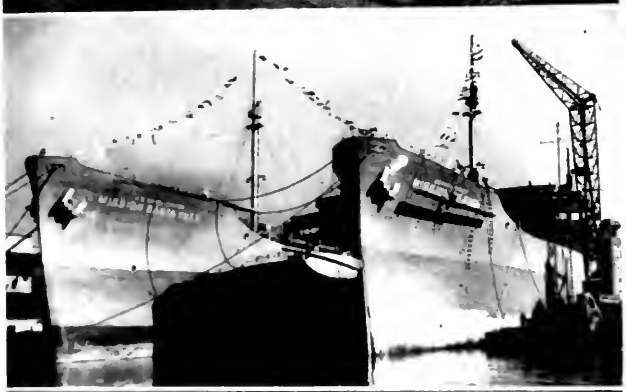
LEFT, top to bottom: The S.S. "President Polk," American President Line Round-the-Worlder, shown in a Todd Shipyard for a routine voyage repair job.

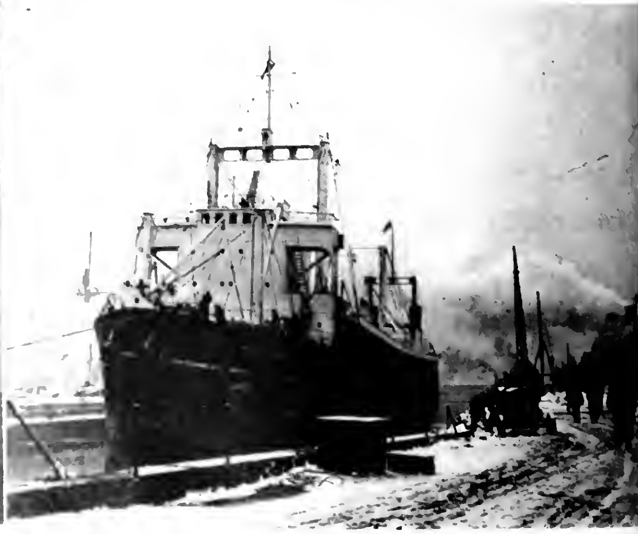
The "George Washington" at Hoboken. Purchased by the Alaska Transportation Company, she was built in 1924, is 390 ft. long overall, 54 ft. wide, and 17 ft. in depth. She has accommodations for 250 passengers.

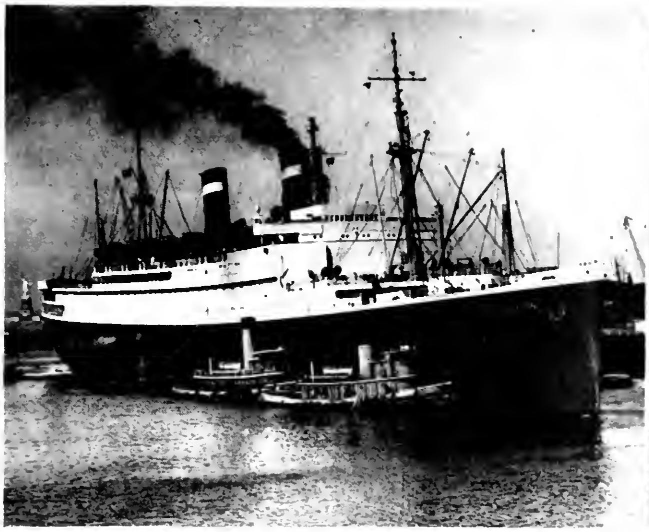
The Navy tankers "Mission Santa Ynez" and "Mission De Pala" took on a gala appearance with cruise flags from stem to stern in recognition of the Navy's birthday celebration. The two oil carriers were in a Todd Yard for general overhaul and face-lifting which involved a new coat of hot plastic paint.

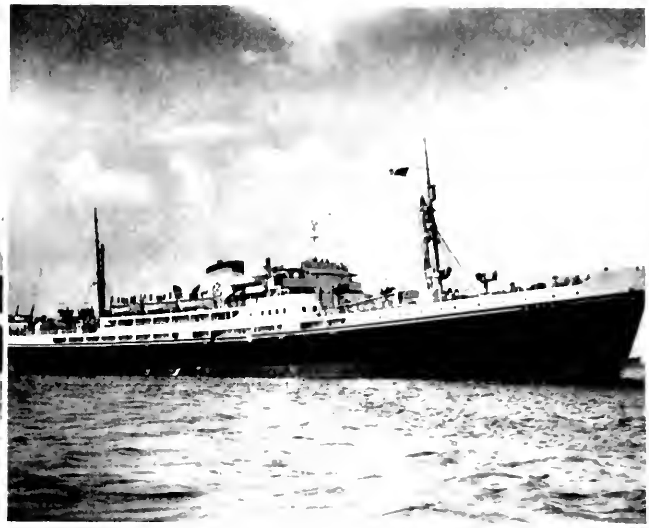
The former T-2 tanker, "Rainier," recently converted by a Todd Yard for the French Merchant Marine Mission, steams out on her initial voyage to Curacao and Port La Cruz, Venezuela.

BELOW: The Norwegian whaler "Anglo-Norse" at a Todd Shipyard for a 24-hour "shave" before returning home. Veteran shipyard workers say the coat of barnacles removed was the heaviest in their experience, weighing some 35 tons, and slowing her down from 12 to 5 knots per hour. It took as many as 75 men per shift for 24 hours to scrape the ship's bottom and sides up to the 27-foot water line. She hadn't been drydocked for over a year, and acquired this horny coat lying around in tropical waters off Peru for 7 months.









ABOVE: The S.S. "Washington," second largest ship in the American Merchant Marine, operating on the trans-Atlantic service with the S.S. "America" for the U. S. Lines, is shown here turning her back to the Statue of Liberty as she enters Erie Basin for a regular overhaul at Todd's Brooklyn Division.

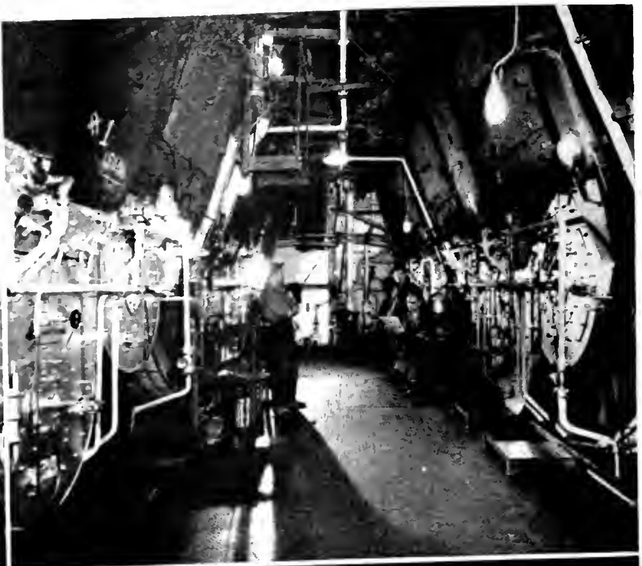
RIGHT, top to bottom: The "Giresun," newest addition to the Turkish Merchant Marine, shown leaving Todd's Brooklyn shipyard on her sea trials, following reconversion from a troopship to passenger service. Formerly the "Aconcagua," of the Chilean Line, the "Giresun" will carry 413 passengers in world wide service out of Istanbul. Her sister ships, the "Ordu," ex-"Copiapo," and "Trabzon," ex-"Imperial" were likewise transformed by Todd's Brooklyn and Alameda Yards, respectively, while another vessel, formerly the "Monterey," was reconverted and renamed the "Adana."

One of the most interesting post-war jobs performed by Todd Shipyards was the conversion of four U. S. Navy frigates for the Argentine government. Shown are the "Sarandi," the flagship, leaving Todd's Hoboken Yard, and the "Trinidad," ex-"Caicos," slipping past the Empire State Building.

General view of dock at Galveston showing fishing boats "Atlantic," "Santa Lucia" and "S. G. Giuseppi."

The training ship "Golden Bear" of the California Maritime Academy in Todd's Alameda Yard for its annual overhaul.

BELOW: During World War II, Todd built destroyers like this, as well as tankers, troopships, LCI's, and aircraft-carrier escorts.



Scene showing the Todd "TIFA" (Todd Insecticidal Fog Applicator) in action. This machine represents the modern method of applying newly developed and old type chemicals in a true, clean fog, created by the heating and fractionating of liquefied insectical chemicals into sub-microscopic particles.

Weld inspection by radiography technique in use at Todd shops. This method of inspection records internal cracks or crevises on film.

has three sections, an overall length of 614 feet, an inside width of 84 feet, and a lifting capacity of 15,000 tons. The second one has a lifting capacity of 12,500 tons and the smallest lifts 2000 tons. The "Lower" plant has 45 buildings, with a floor area of 243,000 square feet, and its 7850 feet of industrial trackage provides complete coverage for all wharves. The "Upper" plant has wharves totalling 1250 feet, along with shops, utility and storage building.

The company also maintains a fully-equipped shore shop in downtown New Orleans for round-the-clock, quick turnaround services to vessels at their own piers or at anchor.

Todd At Brooklyn

Todd possesses the largest privately owned graving dock in New York Harbor at its Brooklyn Division. This dock can accommodate vessels 730 feet in length. The yard has two graving docks and four floating dry docks. The second graving dock is 573 feet in length. The four floating dry docks can accommodate vessels of 8425 tons, 10,000 tons, 16,000 tons and 18,000 tons respectively. The yard is located at the foot of Dwight Street, in the Erie Basin, directly accessible from Red Hook Channel of Upper New York Bay, just south of

(Please turn to page 93)

Hydraulic gap press of 400-ton capacity, for flanging operations and shaping tank and boiler heads, used at Todd's.

CAPTIONS FOR OPPOSITE PAGE

Left, top: Stress relieving on tanker in Todd yard.

Left, center: Building up worn surfaces by spraying of molten metal increases wearing values, saves cost and time of replacement.

Left, bottom: To speed up the drying of the vast bottom of the "Nieuw Amsterdam" a Todd-developed "Thag" machine was brought into use. It was set up on the dry dock bed near the stern on the port side, and a main hose, about 200 ft. long and 20 inches in diameter, was stretched along the ship's bottom, with four 50-ft. extensions snaking under it. Continuous heat of about 250 degrees F. was applied to the bottom by this hot blower for about four hours.

Right, top: Boiler room, spic and span, after the oil-burner installation (Todd "Hex-Press" mechanical pressure atomizing fuel oil burners). Fifteen burners were installed on the 5 Scotch-type, Howden forced-draft boilers, as well as fuel oil storage, pumping, heating, and straining equipment.

Right, center: Magnetic particle inspection detects sub-surface flaws, preventing vital part failure after ship's return to sea.

Right, bottom: Work on a transportation turbine at Todd Yard. Todd plants perform industrial machining repair work.

Singing Propellers

By WILLIAM LAMBIE

Editor's Note:

Part I of this article, which appeared in the October *Pacific Marine Review,* dealt with the whistling or singing of propellers in general.

Part II deals in particular with propellers on Liberty type vessels on which previous articles have appeared in the *Pacific Marine Review.*

PART II

IN a recent paper[2] we briefly referred to the so-called "singing" propellers and Liberty type vessels, and now in a current marine magazine appears an Abstract of a Paper entitled "Screw Shaft Failures—The Influence of Torsional Vibration and Propeller Immersion"[3] with reference to these same vessels. Also, in a circular letter dated May 6, 1949, The American Bureau of Shipping states "The percentage of propeller shafts found cracked and broken, not only on liberty ships but on all Types of vessels has been increasing steadily in recent years and is still increasing.

For the record, and quoting from the abstract referred to, "The construction of the largely welded dry cargo liberty type of vessel was begun in the U. S., in January 1942, and altogether no less than 2580 were built, of which 2315 remained at the close of hostilities . . . Information at December 1, 1948, revealed that altogether a total of 583 liberty screw shafts had been renewed, including during the past three years about 100 casualties at sea with resulting loss of propeller . . . Accordingly, in the absence of parallel information on the rate of renewal of Liberty screw shafts from all causes, it would be premature to assume that all is now well."

Several of our members have the responsibility for the operation of some Liberty type vessels, and to them the above Report must be somewhat disturbing. To our knowledge, the propeller has not yet been mentioned emphatically as a possible cause of the shaft failures, and it is thought that an extension of our previous remarks may be of some interest.

The abstract of the paper mentioned is quite comprehensive, and includes the author's discussion of the recommendations made by The American Bureau of Shipping with regard to the avoidance of continuous operations at critical speed.

Quoting from the Author's Conclusions:—"It is believed that where steps are taken to ensure propeller immersion comparable with those usual in the coal burning Ocean class, together with precautions as indicated, to avoid continuous operations at or near the existing 3rd order critical speed, these measures will confer adequate protection against further screw failures in this class of vessel, particularly where attention has been paid to the many smaller, but nevertheless important details of which examples are given in the Paper."

In their letter of April 9, 1948, The American Bureau of Shipping states in regard to (1) SEALING ARRANGEMENTS, "Existing arrangements for sealing the propeller shaft have not proved entirely satisfactory. If sea water has access to the shaft, the endurance limit of the material is appreciably reduced and failure may result from the corrosion fatigue. There have been numerous failures from this cause and the Bureau feels an outside packing gland should be fitted when the shaft is next drawn for examination . . ."

Originally the Liberty ships had a rubber ring fitted in the counterbore at the end of the liner, which was quite common practice for several years. The counterbore was usually then made large enough to permit the rubber to flow as it changed shape when being compressed by the liner, this to ensure that it would not prevent the propeller from coming up metal-to-metal on the taper.

We have had a few such cases in which the propeller had become loose on the shaft, but we believe it was not because of insufficient room in the counterbore to allow the rubber to flow, but because during the time the propeller was being moved up on the taper, a small particle of the rubber had been caught by the sharp edges of the counterbore and was left on the shaft, thus making a metal-to-metal fit quite impossible. In such cases it seems that whether the water had leaked in or not, the fit was imperfect and ultimately the propeller would become loose on the shaft. With the arrangement now proposed by the Bureau, the rubber ring is not installed until the propeller has been found to be hard up on the taper, and is a decided improvement.

In the same letter, under the heading KEY AND KEYWAY, the Bureau states "since tool marks, nicks, scratches and the like all act as local stress raisers, care should be taken to see that all such marks are carefully removed or blended into the shaft contour. All sharp corners on the keyway should be removed by grinding. There has been evidence of the key bearing excessively at the sides at the forward end of the keyway in a number of cases and it is felt that this condition should be relieved by slotting the key longitudinally for several inches or by other suitable means."

In regard to the last sentence, would not the suggested slotting only make the key a slack fit? I fear that if slotted, it would only act as a key after the propeller

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[2] "CAVITATION AND THE PROPELLER OF MAXIMUM EFFICIENCY," W. Lambie.

[3] "SCREW SHAFT FAILURES—THE INFLUENCE OF TORSIONAL VIBRATION AND PROPELLER IMMERSION," S. Archer, B.Sc., Senior Engineer Surveyor for Research, Lloyd Register of Shipping, April 8, 1949, M.I.N.A.

had moved slightly on the shaft. Could not the evidence given in the Abstract be interpreted to show that the propeller was under constant vibration and eventually had caused the cracks at the sides and forward end of the keyway? Further in their letter the Bureau gives recommendations which if carried out would in their opinion ensure operation of the engine clear of torsional criticals (a) at 66 R.P.M., (b) at 66 R.P.M., with a new propeller designed to absorb about 2200 I.H.P., (c) at 76 R.P.M., when suitable flywheel is installed on the after end of the engine, (d) at 72 R.P.M., with two sections of intermediate shafting increased from the present 13½" diameter to 17" diameter, and to 76 R.P.M., by further modification along these lines.

The Bureau has found that the "excitation energy for the third order critical at 76 R.P.M., comes from the engine" and "that a complete cure by propeller design alone is not to be expected."

The Liberty type vessels offer particularly favorable conditions for the efficient operation of the propeller. The run is remarkably good and there is ample clearance between the stern frame and the propeller blades. As a result there should be little, if any change in the thrust exerted by each blade as it passes the stern frame.

With a well balanced four bladed propeller totally immersed, any loss of thrust which conceivably might occur due to interference from the stern frame and deadwood, in any case would occur simultaneously on two opposite blades, the loss on the upper balancing that on the lower, excepting possibly for some slight difference due to difference in wake above and below. Consequently vibration from this cause should not be very vital and would act only in a longitudinal direction, so there would be little or no tendency to bend the shaft or cause excessive wear-down on the stern bearing.

In 1942 we were present on a trial of the S.S. *Ocean Venus,* a Liberty type dry cargo vessel built at Pittsburg, California, for the British Government.

The vessel was in ballast condition and there was a decided whistling and humming noise being "telephoned" all over the ship from the vicinity of the propeller. At the same time there was considerable vibration felt in the shaft alley at the After Peak Bulkhead, and on the Shelter Deck, both at the bow and the stern. When standing at the Bow one could actually see the stern vibrate.

At that time it was felt by those on board that the propeller seemed to be the seat of both the propeller noise and the vibration.

It was claimed that examination showed the leading edges of the propeller blades were not of exactly the shape shown on the drawing and that the trailing edge and the leading edge near the tips were not finished as "fine" as they should have been. Templates were furnished by the designers and the leading edges were ground to suit, while the trailing edges were made to agree with the drawing.

Subsequent trial showed that those modifications resulted in little or no improvement.

It may be of interest in passing, to note that when grinding the edges and the surfaces of the blades, it did not matter whether the grinder was operated along radial lines or transversely across the blade, the resulting hum of the propeller had the same note, i.e., the frequency of the vibrations set up was the same no matter at what point on the propeller blades the excitation was applied.[3]

Recently as she neared port in loaded condition, we boarded a Liberty type tanker on which a flywheel had been installed at the after end of the engine, in accordance with instructions issued by the A.B.S. The weather was good, calm sea with slight swells, but we found the propeller to be whistling and humming very badly, and there was considerable vibration felt at the aft end of the Shaft Alley and at the stern on Deck. The vibration and propeller noise was very pronounced from 60 to 70 R.P.M. and was reported to be present at full speed too.

Here we have two vessels of similar size and form, one a dry cargo ship, the other a tanker. Both have the engines amidships, the engines being alike with the exception that the tanker's had a flywheel installed on the after end. The propellers also were alike.

On trial the dry cargo ship was in ballast condition, while the tanker was loaded.

The propeller on each ship was found to whistle, sing and vibrate in much the same manner.

As mentioned before, we have had many experiences with other cargo vessels, tankers, and passenger ships as well as with a number of smaller vessels in which the noisy propellers had been changed to silent, the vibration eliminated by changes made to the propellers themselves.

The evidence might indicate that the excitation energy for the 3rd order critical may be coming from the propeller and not from the engine. If this is true, then a complete cure by propeller design alone can probably be expected, and the engine allowed to make its designed 76 R.P.M.

In a calm sea with the propeller operating at quite a low slip, it would vibrate due to the constant bombardment of collapsing cavities on the blade faces. This might be akin to the flutter mentioned as being present on some airplane propellers. However, instead of being "evidence of structural inadequacy" it would more likely be evidence of too low slip.

In any but the calmest sea, the slip is probably varying somewhat as the vessel rolls and pitches. When the slip is a trifle low to begin with, as we believe it actually is, it might happen that at one moment the propeller may be operating to the left of, and at the next much closer to, the locus of the maximum efficiency. Consequently, the thrust from the blade faces might momentarily disappear entirely and actually become a drag, only to come back again a moment later as a positive thrust.

Since the blade faces are said to contribute from 20% to 33% of the total thrust. it seems that there might be a possible variation of as much as 30% or even more, in thrust. This is a tremendous variation and apparently it might *occur even if the propeller is constantly and completely immersed, and the engine not racing.*

The dangers of operation at low slip are very real although somehow slips of 10% to 20% seem to pre-

(Please turn to page 99)

3 "MARINE PROPELLER BLADE VIBRATIONS: FULL SCALE TESTS." Prof. L. C. Burrill M.Sc., Ph. D., N.E.C. Inst., Vol. 62, 1946.

Marine Turbine Lubricating Systems

— Notes on Design and Operational Improvements —

By ALBERT C. LANTERI

Chief Engineer, The Texas Company, Marine Sales Division

NUMEROUS recommendations have been made for cleaning of turbine lubricating oil systems before the units are put into operation or after units have been in operation for a long period of time.

Little mention has been made, however, of changes which can be made in marine lubricating systems to make the cleaning operation easier or changes which can be made to keep systems clean and extend oil service life. This should be done to overcome structural defects which were in the original installation or which occurred during major conversion operations from wartime service.

Commercial Vessels

Certain design features not only hinder the cleaning of a turbine lubricating system and detract from the desirable qualities of the circulating oil as a lubricant and cooling medium but also shorten the service life of oil. The undersirable effects on the entire unit, when proper maintenance and cleaning cannot be carried out because of installation shortcomings, are obvious.

Difficulties that have come to light on many marine installations were not, in general, due to shortcomings of any of the agencies responsible for manufacture or operating of the turbine units but rather to incomplete coordination of all phases of the operation, particularly under extreme wartime conditions. Better coordination of design and erection problems should be beneficial to all concerned, since it would assure the final operator of the vessel of significant improvements in his complete operating unit, which would assure savings during the entire life of the vessel.

It is our feeling that close attention to the following details will greatly improve the lubricating oil system of a main unit:

A—*The Engine Builder.*

Now that the major portion of turbine gears and gear casings are fabricated from steel plating, rusting is more of a problem than it was when gears and casings were made by casting.

1—It would be highly desirable to increase the number of inspection plates in the gear casing, and these should be of the bolted type. This would increase the ease of inspection and, if necessary, of cleaning of the gears and casing interior and would greatly improve access to the interior of the gears themselves.

2—At present it is fairly common practice to weld long sections of lubricating piping and drain lines. Manual cleaning and visual inspection are not possible because of welded angles, bends and joints. Installation of piping in convenient lengths with flanges or other means of separation would greatly facilitate cleaning and inspection.

3—Particular attention should be given to design of casings to permit adequate ventilation and care should be taken to eliminate pockets where condensation may collect and cause rusting.

B—*The Design Agent (Naval Architect or Shipyard).*

1—Tanks. The design agent should make certain that all tanks (gravity, storage, settling, dirty oil and sump tanks) are of sufficient size, and with dished or convex bottoms so that water or sediment may be removed at intervals during service without the necessity for complete drainage and manual cleaning.

2—Manholes should be located conveniently in the tanks for easy examination and entry. Those who have had to make inspections of marine lubricating systems will appreciate the importance of this suggestion.

Sump Tanks. Manholes should be situated to permit of easy access and complete inspection.

The bottom of the sump tank should slant toward the center and the center gutter should slant toward the aft end of the tank. The centrifuge suction should be located at the lowest point at the aft end to permit removal of sediment and condensate which may settle out.

The oil inlet and outlet lines should be at opposite ends of the tank, to permit the oil to rest as long as possible and separate entrained air and suspended material. The pump suction should be installed with bell-mouth fitting at least 6″ to 8″ above the sump tank bottom to make certain that the pump suction will not draw in and recirculate material which has separated from the oil and settled to the bottom of the tank.

In certain cases, failure to observe the above precautions has resulted in continued circulation of water and foreign matter and air has not been permitted to escape from the oil. Where inlet and outlets are close together, only a portion of the oil is being continually recirculated, giving actual oil volumes in service much less than desired by the turbine builder.

On some types of vessels the bottom of the gear casing is the top of sump tank. In such designs, the sump tank should be fabricated so that the drain holes from the gear casing are close to the forward end of the sump tank

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* This paper was presented at Marine Engineering Panel, American Merchant Marine Conference and Propeller Club of U. S. Convention, Waldorf Astoria Hotel, October [illegible] 1949.

Use of Compressed Air In Maintaining Tuna Fleet

TUNA CLIPPERS probably are the most costly boats per pound on the high seas. Their trips are of three months duration, sometimes longer, and because of that their 200 to 300-ton cargo holds must be equipped to freeze the tuna caught. They are out the year around for their golden catch, at $310 a ton, and stand for no unnecessary delays for repairs in port.

One of the important yards keeping the $60 million tuna fleet at San Diego, in repair is the Lynch Shipbuilding Company. On the ways, docks and in the shops, the shipyard depends upon compressed air for the operation of the portable tools used in its work. Some of these uses are described here.

The variety of work to be done and the need for doing it well and fast makes compressed air the choice for the power to drive the portable tools used on shipyard repair work. The pressure for production during World War II caused the shipyard to go completely to air-powered tools and the pressure of competition since has caused it to continue with that choise, (see Fig. 1).

Of the 100 to 125-foot tuna clippers, carrying 14 to 18 men crews, about 75 per cent are of wood construction and 25 per cent of steel. Some carry small airplanes for spotting bait, many have radar for fog navigation and all are designed to go through any kind of weather to distant fishing grounds and return with a load as many times a year as possible. Except for a small chapel on each clipper, there is not a stick aboard that has any other purpose than to help catch fish.

Pneumatic drills are used in a number of ways on the wooden boats. Workers can lug down into deep holes in timber because the high power capacity of the tools provides ample energy to maintain speed under load. In the event the air motor should stall, no damage is done, so the drills are pressed to the job at hand without any pampering. The instant reversible feature of air drills makes it possible to back out at will to remove chips.

A typical example of the pneu-

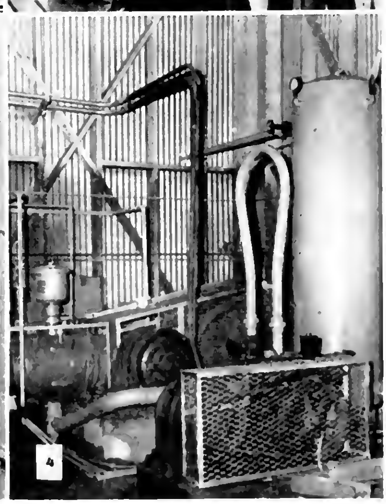
* Data and photos for this article were furnished by the Compressed Air and Gas Institute through the courtesy of Lynch Shipbuilding Co., San Diego, California.

Fig. 1. On deck and from a barge, boatyard workers are using pneumatic tools to clean paint and scale from a steel tuna clipper.

Fig. 2. This air-operated grinder is light in weight for its power. That feature permits faster and better results with less worker fatigue.

Fig. 3. Chipping hammers like this enable the boatyard workers to cover three times the area per hour that would be covered with a single-hammer gun. Pneumatic tools are designed for many different working conditions. Selection of the best tool for the job means greater productivity.

Fig. 4. These two air compressors supply most of the shipyard's needs for compressed air. The larger one in the background has a capacity of 210 cubic feet per minute and has been in almost continuous operation for the past ten years.



matic drills in use on steel work would be the four-cylinder, slow-speed air drill used for hold-down bolts after the main engine is set. This tool drills four holes up to and larger than 1¼-inch diameter at a time.

The use of manually operated T-handle socket wrenches for putting in lag screw bolts sometimes as deep as 30 inches made the work progress slowly so air-operated impact wrenches were put to the task. A job that took an hour by hand is now done in two minutes with air.

A full description of all the ways in which pneumatic tools are used by the shipyard would involve a full description of many different kinds of work done there. However, some of the pneumatic tools generally used and their general applications should be mentioned.

Air-operated sanders, (see Fig. 2), are used for removing paint and smoothing down after a blow torch has been applied, or in the case of steel tanks, after sandblasting. The same equipment is used for smoothing steel plate, finishing welds and similar purposes.

Air hammers, (see Fig. 3), are used for removing weld scale, chipping out wood laced in with engine supports and several other routine and special jobs. Paving breakers are used for ditch work around the yard.

The shipyard tool room not only provides these various types of pneumatic tools, but also keeps on hand various sizes of each type of tool so workers may have the most efficient tool for the job at hand.

The main air compressor supplying power for the several uses mentioned is a water-cooled unit of 210 cubic feet per minute capacity, (see Fig. 4). A smaller unit serves as a standby unit and also cuts into the system during peak loads. The main compressor was installed in 1939 and, with the exception of two overhauls, has been in constant operation since. During the war it operated 24 hours a day.

If the shipbuilding company works its compressor hard, it also takes special care of it. In addition to the proper and regular lubrication and other practices every good operator of a power plant follows, the Lynch shipyard has a cooling tower outside the compressor room by which water is cooled.

In addition to the main and standby units, the yard has two portable compressors. One is a small single stage unit used for divers working around the ways. The other is a two-stage unit capable of building pressures up to 350 pounds per square inch. It is used for testing ammonia lines of boat refrigerator systems, tanks and similar purposes and for starting main engines on boats in for repair.

Portables for other yard work are not necessary as the lines from the main compressor reach every working area and outlets are placed so that workers may plug in their pneumatic tools and go to work wherever they may be. Pressure on the yard lines of approximately 110 pounds per square inch is maintained by having two storage tanks on the system in addition to the receiver tank at the compressor. There is no fire or shock hazard involved in the air distribution system even when the pneumatic tools occasionally are used under water. Nor is insulation a constant problem while the lines are moved around steel and water.

The cost of any commonly used power for operating portable tools is insignificant in comparison with the wages of the operator who uses it, so productivity of the worker in the course of the day becomes the main consideration.

Lynch Shipbuilding has found that pneumatic tools add to worker productivity because of their high power and light weight and the suitability of the tools to all working conditions. At the same time, the yard is saving on tool maintenance labor because the tools are rugged and have the minimum of moving parts to be repaired or replaced.

Compressed air, of course, has other applications in the shipyard than in the operation of portable tools. Air jets are widely used for cleaning of various kinds. Spray painting is another common use and so is sandblasting. In the latter case, however, the shipyard has a way of doing this work which those who are confined to stationary methods might envy. Usually when boats are to be sandblasted, they are towed out into San Diego Bay and blasted with air supplied by the boat's compressor, which ordinarily is used for starting the main engine. This method eliminates dust around the yard which would inconvenience other workers.

The trim and sturdy tuna clippers represent an investment of approximately $350,000, some more and others less according to size and equipment. They cruise far into South American waters and other distant points and are subject to destructive weather and climates. They are worked hard and long. It doesn't take many trips before the work of the elements shows, but the clippers remain shipshape in appearance and inner workings because there is too much at stake not to keep them that way. And compressed air is playing an important part in the maintenance and repair operation.

Corrosion causes an annual loss of about two percent of all the iron and steel in use throughout the world, the U. S. Department of Commerce reports.

Since the cost of paint is only about 20 percent of the total cost of painting structural iron and steel it is not economical to stint on the quality or quantity of paint used, says the National Bureau of Standards, U. S. Department of Commerce.

Admiralty Decisions

By HAROLD S. DOBBS of San Francisco Bar

Right of Suit by Marine Insurance Subrogee

IN THE United States District Court for the District of Maryland, early this year, a libel was filed presenting a claim against the *S. S. Perla* and its owners for cargo damage. The case came to trial in July, and appeared to be in the name of New Hampshire Fire Insurance Company, who had previously issued a marine insurance policy to the cargo owners. In the libel, it is alleged the cargo was damaged in shipment, that the owners had made demand on the insurer, and the latter, as libelant, stated that it had become liable under the policy to pay approximately $36,000 on account of the loss. Proctors for the ship and its owners filed exceptions to the libel upon the ground that the libelant was not the real party interested in the alleged loss and damage, and that it did not appear at the time of the filing of the libel that the libelant had suffered any loss or damage because there was a failure to allege in the libel that the libelant as insurer of the cargo had yet actually paid the loss.

The loss concerned a cargo of 150,000 bags of wheat flour which was transported to Santos, Brazil, and upon delivery to the consignee, part of it was found to be badly damaged by contact with water and otherwise.

Because of the time that had already elapsed prior to the filing of suit, the shipowner alleged the one year limitation for suit against the carrier as provided for under the Carriage of Goods by Sea Act. The Court pointed out that if the libel were dismissed because of its being instituted prematurely, then it would follow that it would subsequently be barred by the statute of limitations. The Court appeared to be weighing equities rather than trying to determine the cause by virtue of the rules, causes and law already known to it.

The major point urged in support of the exceptions was that the libelant did not state that it had actually paid the loss for which it admitted liability. Even at the hearing in the federal court, which was held approximately two and one-half years after the loss, proctors for the cargo underwriters were unable to tell the Court that the claim had been paid, for some reason not made known in the report of the decision.

The Court, using the Balance of Equity rule which I have already referred to, came to the conclusion that the reason suggested for dismissal was rather technical in view of all the circumstances. An examination of the law with respect to this subject, fails to show any general admiralty rule similar to a federal rule which requires that "every action shall be prosecuted in the name of the real party in interest." Even though there is an absence of such an expressed rule in admiralty, other cases have generally considered that proper pleading in admiralty requires the same rule in principle. If the insurer had actually paid the loss before the libel was filed, it is clear enough that it could have maintained the suit as a real party in interest. If it had paid the insured's whole loss, it could have maintained the suit in its own name as subrogee; but if it had paid only a part of the loss, the better practice would have been to bring the suit in the name of the insured itself and also for the use of the insurer. Had the suit been filed by the insured, the insurer could have intervened therein under appropriate admiralty rules at any time if it had an equitable right to the whole or part of the proceeds, if any, of the suit.

In the instant case, the Court found that the libelant as insured was at least potentially the real party in interest. In this connection, it is said in Benedict on Admiralty, Volume 2, Section 245:

> "The party really entitled to relief should always be made libellant. There is no admiralty rule to this effect, but the practice is of long standing. The Civil Rules put it still more sharply and say that every action shall be prosecuted in the name of the real party in interest. In admiralty, as under the Civil Rules, there are a number of exceptions to this principle. The most usual one is the right of an underwriter or insurance company to sue in the name of the assured whose loss has been paid or covered by a loan. The real party in interest is no longer the assured but the underwriter, who has acquired the claim by an actual or an equitable assignment or subrogation."

With respect to the contention that the suit was prematurely filed because the insurer has not actually paid the loss, it is to be noted that the practice of admiralty is more liberal in entertaining jurisdiction than would be the case in a suit at law. Thus, under similar although not exactly parallel facts exceptions to a libel on the ground it was prematurely brought have been overruled by admiralty courts.

The Court held, in further support of the jurisdiction, which, as I have already said, appeared to be on the theory of balancing the equities, that the insurer as libelant might well be treated as having filed the suit in the capacity of agent for the cargo owner as a possible party in interest. It is true, of course, that admiralty recognizes the rule that the agent of an absent owner of the cargo may answer in his own name the principal's

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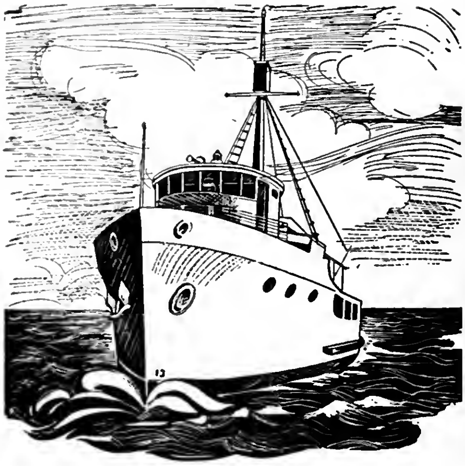
Coast Commercial Craft



The Yacht "Paco"

In a recent conversion from Air Rescue craft 218, the Sausalito Shipyards produced the outstandingly beautiful 104 foot yacht *Paco*. Owner is R. A. Bernot, president of the Mexicana Dragado, S. A., a dredging and construction company of Mexico City. The boat will be berthed at Acapulco and used for pleasure. There are accommodations for 14 guests and a crew of 7.

Unusual in such a vessel is its being triple screw, with three General Motors #671 diesel engines, one each for port and starboard propellers and the third for a center propeller. The latter is for fishing and trolling.

Apart from the new walnut panelling and electric galley, most of the modern equipment was furnished and installed by Ets-Hokin & Galvan of San Francisco. Included were General Electric radar and General Electric combination radio-phonograph console (This set has its own A.C. generator in the engine room. The set is especially constructed to withstand fungus and dampness of tropical waters); Pilot Automatic Steering Device (Photo-Electric Pilot #55); Exide Batteries (110 volt); and Stewart Warner instruments, including recording electric tachometers. Ets-Hokin & Galvan's own 65 watt

The "Paco" on trial run in San Francisco Bay.

At the console of the General Electric Electronic Navigator on the "Paco's" bridge are Ernest Collins of Sausalito Shipyards, R. A. Bernot, owner of the boat, Charles T. Haist of General Electric, and Maurice Antoine of Ets-Hokin & Galvan.

radiotelephone and 100 volt and 24 volt battery charging panels were furnished and installed.

In the several activities of Bernot's firm, numerous small boats are used, so taken along on the *Paco* were six 10-watt radiotelephones for installation on such craft.

The P-218 was purchased from the Lester Fulton Shipyards at Antioch; Pillsbury and Martignoni wrote the specifications; and Bernhard's, Inc. designed the interior decorations and the furniture.

Bethlehem Completes Hot Asphalt Barge

The "Barrett No. 3" (below), designed to transport hot asphalt, was recently delivered by Bethlehem Steel Company's Staten Island Yard to the Barrett Division of Allied Chemical & Dye Corp. The all-welded steel craft has an overall length of 124 feet, breadth of 36 feet, depth at side of 12 feet 8 inches and capacity of 90,000 gallons. Cargo pump and suction piping are steam-jacketed, and the cargo tanks are provided with heating coils sufficient to maintain the asphalt at a temperature of 350 degrees.

Shrimp Trawlers Launched

Fleet of five 54-foot welded-steel shrimp trawlers as they were readied for launching in October at the San Diego plant of National Steel and Shipbuilding Corporation. The vessels are shown here on the 340-foot extension of one of National Steel's marine railways.

The Tuna Clipper

By JAMES F. PETRICH

Editor's note: Other sections of this paper appeared in the September and October issues of *Pacific Marine Review*.

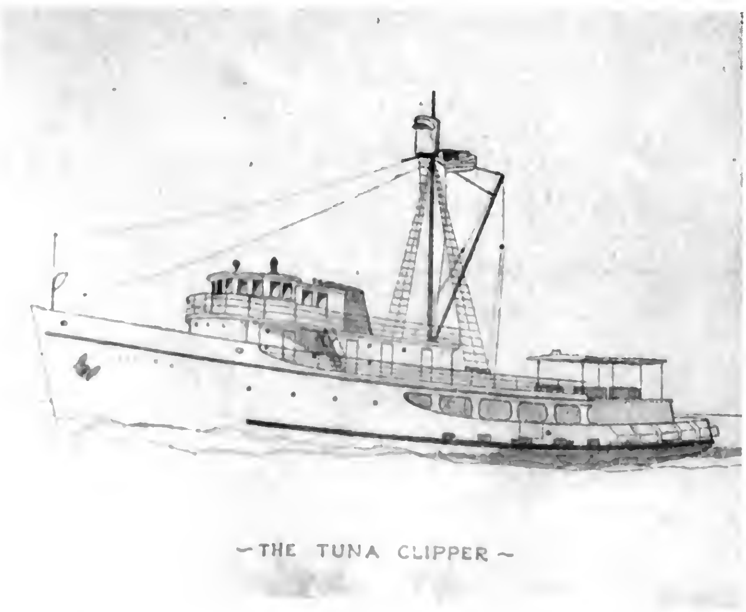
The Shipbuilder and the Tuna Clipper

THE boss has been in a good humor the last couple of weeks. This part of the job always goes the smoothest. The woodpecker-like sound of the air hammer, the pound of topmaul against spike and the whir of the bandsaw sing out the busy activity in the shipyard and sound like music to his ears. The keel is laid, the stem and stern bolted to it and the frames set up and fastened between. Now the ceiling, or inside planking, is going in.

Then it'll be the outside planking, then the beams and decking, and so on. It's easy to work those heavy ceiling planks since the overhead crane has been put in. Time was when the long, heavy 4x8 planks hot from the steam box, were hauled up into the hull on the shoulders of the men. Now the overhead crane picks them up and drops them right in place on the boat ready to be clamped and spiked in. Before, when they set up the horseshoe stern upside down on the floor and pre-fit up all the pieces of top timbers, horn timber and stern frame cants, they would have to take it all down again to carry it piece by piece and fit it all back up in place on the shaft log above the keelson. Now during the pre-fit up, every piece is bolted fast and the whole stern section picked up as one piece by the crane and set in place on the shaft log. In those times it took every man in the yard to horse the keel in place on the blocks. Now it was a simple matter for the crane to pick it up and set it where it was to be laid.

Of course there were other things they had in those days that they never get now. Take that 14x18 fir keel, for instance. It is made up of three pieces scarfed together. Before the war a logging company would go up into the hills and haul out a stick as long as we wanted. At one time there were four keel sticks each 110 feet long trucked down for the shipyards in Tacoma. But no more! It is a shame, too, how the grading of lumber has degenerated. It used to be a pleasure to work with the beautiful clears for planking and the dense structural framing material. Now a man spends half his time searching through a pile of lumber to find a piece suitable to use. And no matter what he'd do, he can't get the sawmill to send any better stuff — not when they can get more money for their good logs selling them directly to the plywood mills than they can get for the lumber they cut from them.

Architect's drawing of the tuna clipper, reprinted from October issue.



Suddenly these visions of the old days and the thoughts of the new vanish as the boss' mind clears for action. His critical eye catches sight of one man vainly struggling with a clamp at a tough bend on the ceiling plank just dropped in place, and he yells an order to two nearby. They scamper to the first one's aid, and, with a few well-executed heaves, along with a sharp admonishment from the boss, horse the plank in place. Satisfied after a few minutes, the boss turns and walks down the gangplank to where he can look up at the bow and see the skeleton ribs all the way back to the stern. This is the point of view where the boat looks best, he thought. The long stem raked high overhead, the smooth sweeping flare and the slim forefoot stepped gradually back to the full belly frames admidships. There is a lot of lumber in those frames. Let's see, there'll be 200,000 feet of lumber in the whole boat. There must be 70,000 board feet of lumber in

those frames alone. Each frame is made up of double flitches, bolted together; and the flitches are sawed from 5 inch lumber to the curve and bevel of the frame pattern.

With about 65 frames on 20 inch centers . . . by the time we waste one-fourth of the cant in the sawing there's about 70,000 feet of lumber just to make the frames alone. Figuring and refiguring went on in the boss' mind always when he settled himself in his office, but out in the yard it turned out to be a luxury allowed to himself only when work was going well, or after quitting time when the men had gone home.

It's a help to have the main engine already inside the hull, his thoughts continue. It wasn't much of a job jacking and rolling the engine in place before the stem and a few forward frames were set in, and now we can finish up the whole boat and not have to leave the house unfastened as we would have to do if we installed the main engine after launching. As soon as the crew finishes the ceiling they can start right in on the 2¾ inch planking. That'll leave the inside of the hull free for the welders and they can start building the tanks (¼ inch plate) right away. First the big bow tank, then the after tanks, working up forward until all the hull tanks and wells are completed. At the same time we can build the lube oil tanks which form the foundations for the two generating sets, and set them and the generating sets right in place in the engine room with the overhead crane. The main deck beams (8″x14″ with 6″ crown) can go on as the tanks go in and the 2¾″ decking, too. The planking crew ought to be finished with the planking about then, so they can go right on to the decking. Then we can put in the galley and the upper deck beams (5″x5″) and the upper decking, and the welders can go ahead with the deck boxes.

After that the house can go up. There'll be a lot of work in there for the finish carpenters; all the partitions, bunks, doors and closets. Then, if we only had the room beneath the roof and overhead crane, the pilot house could go on. I think we'll prefabricate it down on the floor anyway and have it ready to pick up and put on the boat as soon as it is launched. In that way she'll be all covered in case it rains when we start working on its outside at the dock.

The pipefitters and machinists can start in installing the pumps and machinery sometime after the main deck is in. Of course, they'll have to stay out of the shaft alley until we insulate the wells (4″ pressed cork board). A frown passed over the boss' forehead. That was the time his troubles started. As soon as the locating of the machinery began, and the piping and the electrical work and all the rest, then he had a thousand things to think about and work out.

The boss looks again at the line of ribs rising gracefully into the air, and his mind returns again to the work at hand. A billow of steam hissed out of the steam box as its door was opened and the warm moist scent of steaming fir lumber was caught in his nostrils. He smiles to himself as he turns back to his office, "If the shipbuilding game were all like this right now, it wouldn't be a bad business."

4,300 Mile Tow

From Recife, Brazil, to Mobile, Ala., a distance of more than 4,300 miles, the *Eugenia M. Moran*, owned by Moran Towing and Transportation Co., towed the seriously damaged and disabled Panamanian S.S. *Turan*, originally an American Victory ship, subsequently under the Belgian flag.

Something like a year ago the *Turan* went aground on a reef at the entrance to the Port of Recife, damaging her bottom badly.

It was necessary to tow the vessel stern first, since only an engine room bulkhead remained as protection against battering seas.

Tug "Eugenia M. Moran" arriving at Mobile, Ala., with disabled S.S. "Turan" which was towed stern-first from Recife, Brazil, via Port of Spain, Trinidad.

Self-Righting Motor Life Boat

A new motor life boat with the unusual features of being able to right itself and bail itself out if capsized in a heavy sea, recently underwent tests given by the U. S. Coast Guard at Curtis Bay, Maryland.

The tests effectively demonstrated that even if the new boat was turned completely up-side-down it would roll to an upright position, drain itself dry through bailing scuppers and be under way again within a matter of seconds. The craft's power plant continued to function normally during all stages of the capsizing operations.

The boat was designed by Coast Guard Headquarters and built in 1948. It is 36′ 8″ in length, has a beam measurement of 10′ 1″ and draws 3′ 3″ of water, light. Construction is of wood with carvel planking.

Power for propulsion is furnished by a 4-cylinder General Motors Diesel engine with hydraulically actuated reverse gear. Drive to the 26″ x 21″ propeller is through a 2 to 1 reduction gear. At 8 knots cruising speed the engine turns at 1500 RPM and consumes 5.5 gallons of Diesel fuel per hour. The fuel tank capacity of 194 gallons provides a cruising range of 254 nautical miles.

1. U. S. Coast Guard Life Boat with engine running is roped in place ready for capsizing to test self-righting, self-bailing design.
2. Boat is completely capsized while engine continues to run. In the photograph, exhaust from engine rising from side of boat is visible.
3. Lines are slack and boat has started to return to upright position without assistance.
4. Boat has now righted itself and bailed itself dry. Note exhaust from G. M. Diesel engine which continued to operate normally throughout tests.

Bethlehem's Central Technical Department

— Many Structural and Engineering Advances Credited —

THE Central Technical Department of Bethlehem Steel Company's shipbuilding division is a design, engineering, and research organization serving all of the company's thirteen construction and repair yards. Its headquarters are at Quincy, Mass., where it also serves as engineering department for the local yard.

Since its establishment as a departmental unit about twenty years ago, the department has attained a position in the industry that may well be called unique. Serving an organization that has always been noted for its versatility, it has over the years, one time or another, been confronted with practically every problem known to the shipbuilding profession.

One of the guiding principles of the organization has been always to maintain close contact with the men who do the actual building of ships. Every man in a responsible position in the organization is extremely conscious of the practical side of the work and of the importance of arriving at the design which offers the greatest advantages from every point of view.

The department is divided into two main branches, Engineering and Design, and Development and Research.

The Engineering and Design branch is primarily engaged in the preparation of basic ship designs for new construction and major conversions, detail design of important ship components requiring special engineering treatment, selection and requisitioning of important machinery and equipment purchased from outside concerns, and other general engineering service such as the supervision of tests and trials, drydocking, radiographic inspection of welds and castings, and similar projects.

The department does not, as a rule, prepare working plans for the individual yards of the company, as these are normally made in the drafting rooms of the yards where the ships will be built. However, general arrangement plans, lines, principal structure and other basic design plans are produced by the Central Technical Department wherever it is the most convenient way of conveying this information to the various drafting rooms. Where new development is involved, as in the design of turbines, distilling plants, special cargo-handling gear, aluminum and stainless-steel structure, the plan work is necessarily carried out in greater detail.

The Engineering and Design Branch is again divided into a Hull Subdivision, headed by the Chief Naval Architect, and a Machinery Subdivision, headed by the Chief Engineer. Both subdivisions, in turn, are comprised of a number of sections, some of which are common to both. This gives the following organization pattern:

John E. Burkhardt, above, Technical Manager, Shipbuilding Division, Bethlehem Steel Company, joined Bethlehem at its Quincy, Mass. Yard in 1925 as chief engineer. In 1939 he was appointed technical manager in charge of all technical matters, naval architecture, engineering and research for the Shipbuilding Division. He is a graduate of the Royal College of Science, London, and attended the Imperial College of Science and Technology in London for post-graduate work. He was associated with the Bath Iron Works from 1914 to 1925.

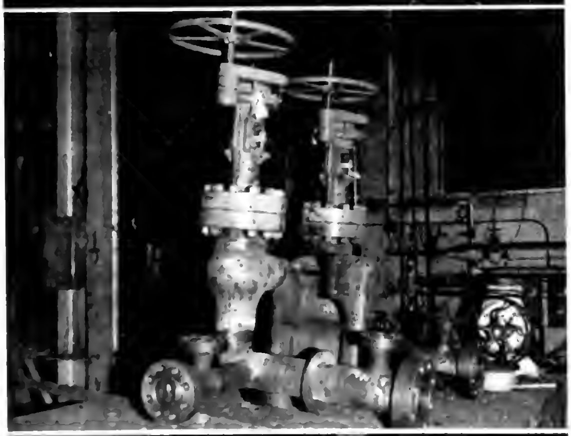
A. Hull Subdivision headed by Chief Naval Architect	(Preliminary Design (Ship Lines and Hull Form (Structure and Rigging (Ship Arrangements (Launching and Weights
B. Machinery Subdivision headed by Chief Engineer	(General Machinery Design (Turbine and Gears (Arrangement and Piping (Heat Transfer Equipment (Ventilation and Refrigeration (Mechanical Equipment and Deck Machinery (Electrical (Performance Analysis
C. Sections common to A. & B.	(Specifications and Procurement (Materials (Trials and Tests (Engineering Services

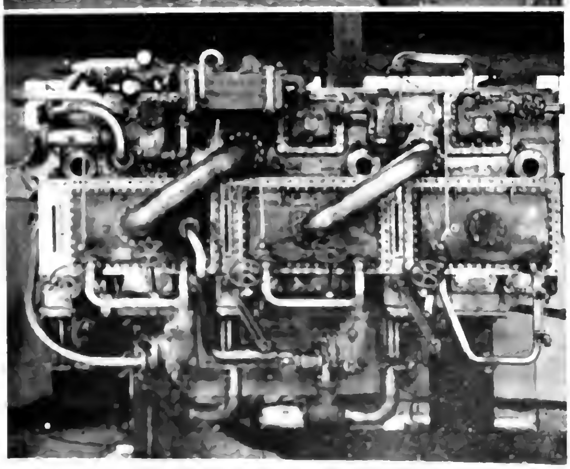
The majority of these designations fully describe the functions of the various sections. A few explanations

Top: Portable X-ray set-up for inspection of welds in hull of ship. Control panel and transformer are contained in box which is moved by crane. X-ray tube, which may be positioned manually, is connected to transformer by 50 foot high voltage cables.

Center: Bulkhead valves for 1500 lb. main steam system fabricated by welding together several steel castings. Castings and welds are inspected by radiography to ensure good workmanship.

Bottom: With a daily capacity of 45,000 gallons, this Bethlehem-built triple-effect distilling plant can supply sufficient fresh water for a ship carrying 600 passengers. Units of this type can be built to supply up to 120,000 gallons daily.





are required, however. For instance, the Preliminary Design Section, in addition to its normal function of settling the design of a ship to be built, frequently collaborates with the owner of the ship to determine the general characteristics and the type of machinery which will best fit his needs.

The General Machinery Design Section determines the principal characteristics of the propulsion machinery and associated equipment required for each ship, after proper analysis of all applicable alternatives. It then co-operates with the other sections to see that the original intention is properly carried out in every detail, frequently following through to the drafting rooms.

The Materials Section is headed by an engineer with metallurgical training and experience. However, his functions are much broader than the title implies. In addition to advising on the selection and the specifications of materials for all special purposes in a ship, he also supervises the radiographic inspection of hull and machinery welding, investigates corrosion and erosion problems, advises on paints and the preparation of surfaces for painting, and has charge of the chemical checks on processes in the yards. One of his principal functions is to keep up with progress in the development of materials and to investigate the applicability of new materials on shipboard.

The Engineering Service Section which covers the whole field of hull machinery, is designed to furnish technical aid to ship owners who are having difficulties beyond the ability of the average operators and mechanics to correct. It is staffed by men familiar with all phases of steam power plant practices and a competent diesel engineer capable of analyzing the operational and vibration characteristics of diesel engines, and who is also thoroughly conversant with their practical operation and upkeep. All resources of the department are available to these men when they are confronted with any particularly baffling problem. Another important function of this section is to bring back to the design office the lessons learned from practical experience with machinery of any design, in order that improvements may be incorporated in later construction.

Research

The Development and Research Branch has two major subdivisions, (1) Research and (2) Yard Methods. The former handles investigations of highly technical nature, while the function of the Yard Methods subdivision is to improve the manufacturing processes and render them more economical.

Among typical research accomplishments is a comprehensive investigation of the structural failures which have occurred in several ships built during the last war, and the measures taken to overcome them. The lessons learned from this investigation are being incorporated in current construction. Other typical research projects include turbine-blade design, measurement of rudder torque on shipboard, and elimination of smoke on passenger vessels.

The Yard Methods section works closely with the supervisory personnel to *improve techniques in the various yards*, working through committees on special subjects, made up of members of the section and represent-

atives from the different yards. This gives the yards the opportunity to exchange experiences in working out common problems, and to acquaint themselves with the development work carried out by the Central Technical Department. Considerable improvement in the quality and economy of welding has been accomplished in this way, to give one example.

The department operates a shop for making models of features for which ordinary plan development is inadequate. For instance, a topside model is necessary to determine the best deck arrangement both for appearance and utility. This includes rigging and cargo handling on merchant ships, and, on naval vessels, the lines of fire of the guns and of visibility from the operating stations. The best design of hawse pipe and anchor housing is another feature that can be assured only by use of a model. Complete engine room models of naval vessels are built to demonstrate the best arrangement and accessibility of machinery. Other models of similar nature are built when special problems arise.

Over the years Bethlehem has built almost every type of ship afloat, from small tugs and trawlers to the largest naval vessels and passenger liners. The company's contributions in the field are many and varied, both in actual ship construction and in the manufacture of propulsion machinery and auxiliary equipment.

In 1931 the Navy Department called for bids for the construction of a group of destroyers. This invitation was, in effect, a competition in design, in which Bethlehem was successful. Many entirely new features were incorporated in the proposed design, such as a welded instead of a riveted structure, higher steam temperature and pressure, the use of A. C. instead of D. C. current aboard ship, and a new distilling plant. These features proved so successful that they have become standard in both naval and merchant vessels.

41 Knot Destroyers

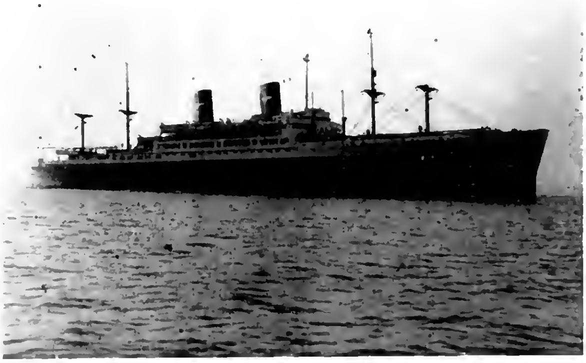
Three years later Bethlehem built the destroyers *Gridley and Craven,* in which a steam pressure of 600 lbs. was used, in conjunction with increased temperature, features which became standard for the Navy to last all through World War II. On the official trials and under specific Navy trial load these two vessels made 41.87 and 41.58 knots, respectively, a record which still stands.

Bethlehem was among the pioneers in the development of the steam turbine in this country, and most merchant vessels built by the company are equipped with turbines made in the shop at Quincy.

Improvements in steam machinery hinge largely upon steam pressure and temperature. For some years prior to World War II, and during that war, the steam conditions in general use were 450 lbs. pressure and 750° F. for merchant ships, and 600 lbs and 850° F. for naval vessels.

High Pressure Steam

In 1940 Bethlehem developed and installed an experimental plant for 1200-lbs. pressure in which steam is reheated by the boiler after passing part way through the turbines. This vessel, the *Examiner,* of American Export Lines, has operated successfully ever since. Following this, Bethlehem built eight large ore carriers using 1400-lbs.



Top: The destroyer U.S.S. "Gridley", built by Bethlehem's Quincy Yard 12 years ago (in 1937), still holds the Navy speed record at 41.87 knots—established on her official trials. The increased steam pressure and temperature features of this craft set the standard for Navy fighting ships during World War II.

Center: Ore carriers of the Venore class, eight of which have been built by the Bethlehem-Sparrows Point Shipyard, are the largest and fastest of their type afloat. These single-screw, turbine-driven craft have a fuel consumption of only 0.51 lbs. per shaft h.p. per hour, and their main machinery operates at 1,400 lbs. pressure with steam reheat.

Bottom: Complete air-conditioning of all first class accommodations is one of the many advanced features of the luxury liner S.S. "President Cleveland", built by the Bethlehem-Alameda Shipyard for the American President Lines.

steam pressure, also with the reheating feature. The fuel consumption of the machinery of these ships, the largest ore carriers afloat, is 0.51 lb. per shaft horsepower, the lowest yet attained by steam machinery on shipboard.

The early models of distilling plants for use in making fresh water from ocean water on naval vessels left much room for improvement. In 1933 Bethlehem completed a plant for the destroyer *Farragut* which established a new standard in compactness and efficiency. Developments have continued since that year, with marked progress. During World War II many merchant vessels found their tank capacity and their small emergency distilling plants inadequate, and a large number of them were fitted with new plants of the Bethlehem type. Today ship operators realize that the ability to make fresh water efficiently is not only a convenience but a definite economic gain.

Bethlehem-Frear corrugated bulkheads which are used extensively in tankers represent an important advance in the structural design of such vessels. Being made without stiffeners, they are about 13 per cent lighter than the older-type bulkhead assemblies, thus making possible a greater pay load. Their smooth contour also provides better drainage in the tank spaces, which facilitates cleaning and reduces corrosion, an important item in prolonging the life of a tanker.

Air Conditioning

Bethlehem was among the first to recognize the possibility of air conditioning aboard ships. The first application was made nearly twenty years ago, to the dining rooms of three passenger vessels built at Quincy. Two large passenger vessels recently completed at the Alameda yard were fully air conditioned throughout, probably the first vessels thus equipped.

Bethlehem also pioneered in the development of all types of steel division bulkheads. The Panama liners, built at Quincy in the thirties, have double, insulated steel bulkheads. These vessels were the first to meet the requirements of Senate Report 184 for fireproof construction and subdivision resulting from the investigations of the *Mohawk* and the *Morro Castle* disasters.

Experiments with repair welding of castings were started by Bethlehem several years before the last war. This work was greatly facilitated by the use of radiographic inspection in which Bethlehem also pioneered. Use of coated electrodes and the development of the proper welding technique, with careful preheating of the work, soon produced excellent welds, frequently stronger than the casting itself.

Through this work sufficient experience was gained for tackling the problem of subdivided steel castings. Many castings of intricate design and great variations in thickness of section lend themselves very well to this method of production. Sounder castings are generally produced, the design can be made to prevent dangerous stresses, much time may be saved in cleaning intricate parts, and machining may be reduced materially.

Launching Triggers

Mechanical triggers having distinct advantages over the hydraulic triggers formerly used, were developed for the launching of the battleship *Massachusetts.* These triggers provide a better support for the vessels during launching and leave a much shorter section of the hull under tension after the shores have been removed. The use of steel for launching poppets was also developed at Quincy. Steel poppets are less bulky than poppets made of wood, and they need not be weighted down to sink. They suffer little damage in launching and may be used over and over again for sister ships. After revamping, they can also be readily used for ships of a different type.

In normal times the real shipbuilder must create rather than copy, and in any diversified and well-organized shipbuilding concern which hopes to continue in business, the ability to do this is essential. The builder of ships must have regard for four major principles—safety, speed, economy, and comfort. The Bethlehem Shipbuilding Division handles the complete job of ship construction, from the design, engineering and preparation of plans to the delivery of the finished ships, a large undertaking, everything considered, in the construction of the complicated ships of today.

Preen "Queen"

One of the fastest hull scaling and painting jobs on record was completed recently when the 22,500-ton Furness liner "Queen of Bermuda" left Bethlehem Steel Company's Brooklyn 56th Street Yard less than 24 hours after she was dry docked for the work. More than 100 scalers and painters were used in the task which was accomplished in the 56th Street yard's 25,000-ton dry dock, the largest commercial floating dock in the N. Y. area. Work on the cruise queen started in the Bethlehem yard at 4 p.m., October 18 and was completed at 7 a.m., on October 19. Use of quick-drying paints permitted the vessel to leave the yard a few hours later. The hull area which was hand-scaled and brush-painted with two coats was estimated at 65,000 square feet.

Rigging Standards

— And Their Relation to Safety

Continuing the series of articles and charts from the Industrial Indemnity Company's booklet on *Rigging Standards for Longshoremen and Harbor Workers*, these charts on pages 59 and 60 deal with manila rope. They are worth clipping and keeping handy.

What Types of Wire Rope

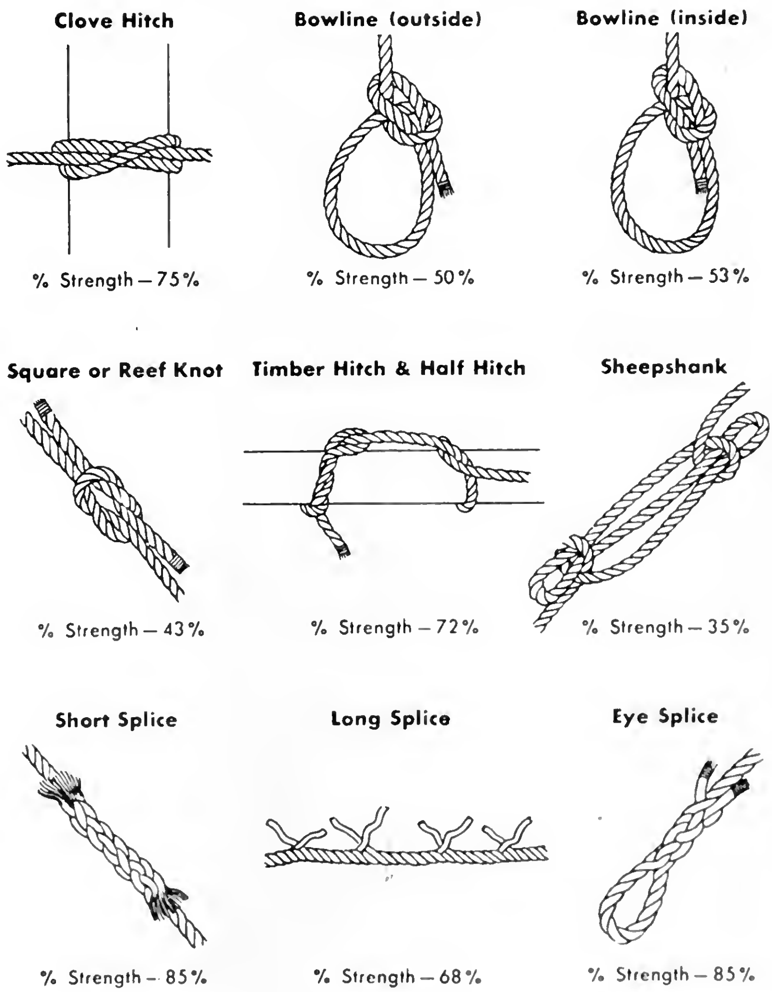
Recently the pendant on a clam shell used for discharging bulk cargo carried away only a couple of hours after it had been carefully inspected and found to be in apparent good condition. Fortunately, no one was injured and little or no damage was done. The point of this story is that a wire rope distributor recommended that a different type of rope be used in the future.

There are nearly 40 different types of wire rope, many of which can be obtained in either regular lay or Lang lay, preformed or non-preformed, and with either fiber or wire cores. The number of individual wires varies from 21 in a 3 x 7 highway guard cable to 366 in a 6 x 61 extremely flexible rope. Various different constructions include Seal, Warrington and Filler Wire.

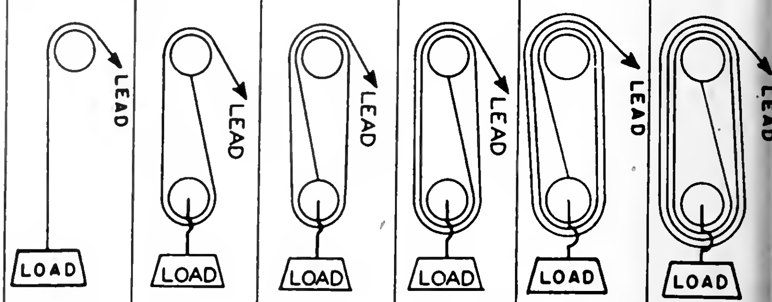
The selection of the best type of rope for a particular job is usually a compromise between several different qualities. Many small wires bend over small sheaves with a minimum of fatigue but they are quickly worn through by dragging over rough surfaces. On the other hand, a few large wires might withstand a great deal of abrasion but would break through being bent over small sheaves. Fiber core ropes have more resistance to shock loads than wire core ropes but are subject to crushing on a drum. The value of special lays and constructions may be offset by increased price and the overall extra cost of carrying several types on hand.

The evaluation of all these factors is a difficult one and requires a great deal of knowledge of and experience with the different types. The various wire rope manufacturers publish a great deal of information on this subject which may be had for the asking. They also have available for free consultation qualified engineers to give advice on particular problems.

Approximate Efficiency of Manila Rope Knots and Connections As Compared to Safe Load on Manila Rope



STRENGTH OF MANILA ROPE AND TACKLE

Circumference of Rope in Inches	Diameter of Rope in Inches	Minimum Size of Blocks in Inches	SAFE LOADS IN POUNDS						
			Lead Line Pull (Lbs.)	1 part fall 1 single block	2 part falls 2 single blocks	3 part falls 1 single blk. 1 double blk.	4 part falls 2 double blocks	5 part falls 1 double blk 1 triple blk.	6 part falls 2 triple blocks
									
1-1/2	1/2	4	530	475	850	1,200	1,400	Do not use 5 or 6 part falls with 1/2" rope	
2-1/4	3/4	6	1,080	970	1,800	2,400	3,000	3,500	
3	1	10	1,800	1,620	3,000	4,050	5,000	6,000	6,700
3-3/4	1-1/4	12	2,700	2,430	4,500	6,075	7,500	9,000	10,000
4-1/2	1-1/2	14	3,700	3,330	6,100	8,500	10,500	12,000	13,500

1. The above tables are for new Manila rope.
2. For Sisal rope, reduce the above values by 1/3, or use rope next size larger.
3. Tackle values as given, all allow for one snatch block, snatching lead line (to engine spool).
4. Always use the fewest snatch blocks possible.
5. If more than one snatch block must be used, add one extra part for each additional snatch block used, in addition to the number of parts shown for the weight to be lifted.

10-ton propeller being hoisted aboard the 'Paraguay' for rush delivery to the 'Navigator'
Port of Oakland [illegible]

Quick Propeller Replacement

A 10-ton manganese bronze propeller was loaded aboard the *Paraguay* of the Johnson Line at the Port of Oakland's Grove Street Pier, for rush shipment to Vancouver, British Columbia, where it was installed on the ill fated vessel, *Navigator*, which was towed in from the Aleutians.

On October 10 the *Navigator* lost her propeller 900 miles west of Vancouver and arrived at the repair yards of Pacific Drydocks, Ltd., in North Vancouver October 19.

The propeller and a shaft, weighing 6½ tons, plus additional parts making a total shipment of 20 tons, were manufactured at the Bethlehem Steel Company San Francisco yard and taken from stock for this emergency repair job.

The *Navigator* is a 7000-ton cargo vessel under Pan American registry operated by Compania Naviera del Caribo. It was towed from Aleutian waters by the United States Coast Guard Cutter *Chautauqua*, which is based at Alameda.

The incident caused much interest at the Port of Oakland as the executive officer of the Coast Guard vessel is Lt. J. G. Bastow, Jr., son of the Assistant Port Manager and Assistant Chief Engineer, J. G. Bastow.

On the Ways

New Construction—Reconditioning—Repairs

Annual Overhaul of "Golden Bear"

The training ship *Golden Bear* of the California Maritime Academy entered Todd's Alameda Shipyard for the annual overhaul provided by the Maritime Commission, which defrays the cost of such overhaul not to exceed $50,000. The *Golden* Bear was drydocked, the hull was dry-sand-blasted and given two coats of anti-corrosive and two coats of anti-fouling paint together with a complete check-up on all underwater fittings, prior to her anual cruise to Mexico and South America.

The *Golden* Bear is maintained and operated by the officers and midshipmen of the Academy, and all normal repair items are handled by the school itself. Structural alterations for betterments as a school-ship and major repair and overhaul jobs are performed by the overhaul yard on specifications prepared by the ship's officers and approved by the Maritime Commission.

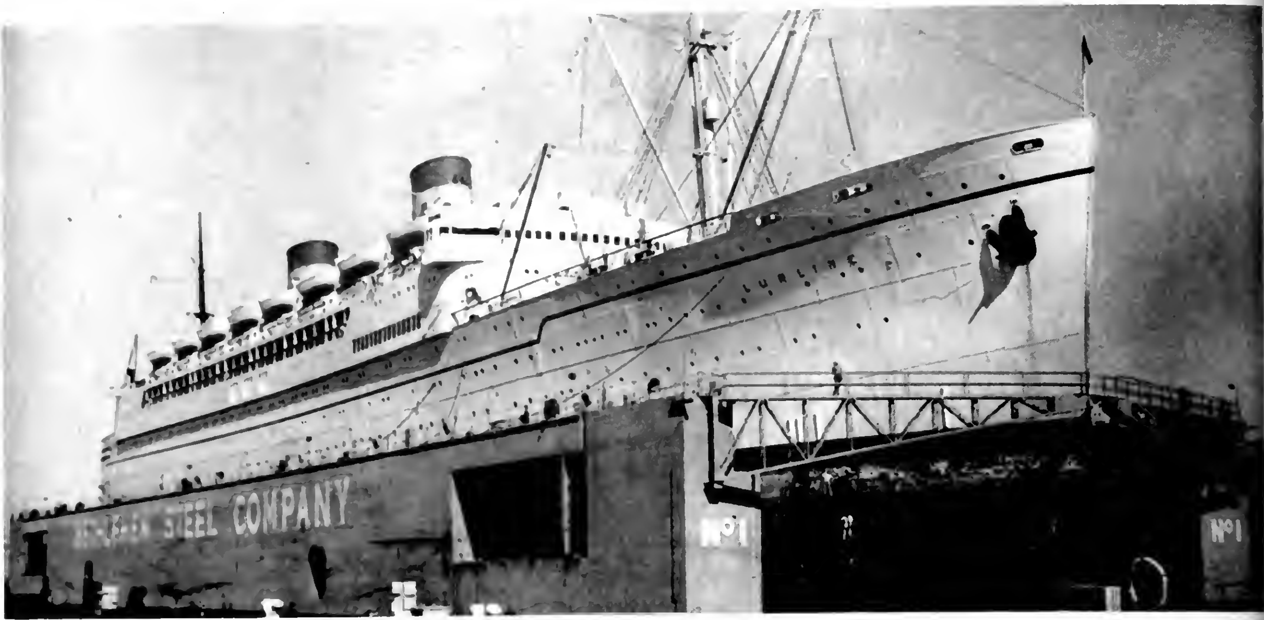
Picture of the *Golden Bear* appears on page 41 of this issue.

Yuba Builds Piledriver Barges

Built for the Board of State Harbor Commissioners for the Port of San Francisco, this is the first of two piledriver barges which Yuba Manufacturing Company is building under contract. They are 30 ft. wide and 80 ft. long and are of welded steel construction.

The barges were built in Yuba's plant at Benicia, California and assembled on waterfront property owned by the Company. Upper photograph shows the first barge just before launching and the lower photograph shows the same barge after launching and floating in Carquinez Straits.

Barge before and after launching at Yuba Manufacturing Company's plant at Benicia. Long prominent in the building of dredges, Yuba has come to the fore in barge building also.



The "Lurline" on drydock. The only important barnacle accumulation on the vessel was on the boottopping, as appears in light-colored smudge on lower bow in the picture.

Lurline on Drydock

Just returned from Honolulu where she was tied up since the beginning of the longshore strike, the S. S. *Lurline,* Matson luxury liner, is shown above on the 22,000-ton floating drydock at the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division. Here, an accumulation of barnacles and other marine growth was removed from her hull.

It was expected that months of idleness in tropical waters would have developed a heavy marine growth, and perhaps corrosion of plates. As will be seen in the pictures, however, there was very little of either.

On the *Lurline's* preceding drydocking, last February 20, one coat of International's Bare Plate Primer and one coat of Anti-Corrosive had been applied; and from keel to bilge keel, Tropical Anti-fouling, with Super Tropical Anti-fouling from bilge keel to light load line.

In addition to drydocking and hull painting, reconditioning work on the vessel prior to her resumption of service included checking her rudder, opening and inspecting of sea valves, and boring out the vessel's starboard stern tube for renewal of the bushing.

The *Lurline* sailed again for Honolulu on November 8.

Left: R. A. Forster, General Superintendent at Bethlehem's San Francisco Yard, examines marine growth on underwater portion of "Lurline's" hull. He is scraping off some coral worms Right: View of light marine growth on port side after section of hull.

Todd Readies "Tel Aviv" For Israel Service

Israel's second transatlantic vessel, the 10,300 d.w. ton *Tel Aviv,* has been readied by Todd's Hoboken Division and left on her maiden voyage under the new flag and new owners, the America-Israeli Shipping Co., Inc., agents for her owners, the Israel America Line. The *Tel Aviv* is the former Canadian-type Victory ship *Hants County,* with an all-riveted hull, and bale capacity of 499,000 cubic feet, built by the West Coast Shipbuilders, Ltd., in Vancouver, B. C. in 1943. The first vessel of the new line, which will serve the eastern U. S. ports and Palestine, is the *Haifa,* formerly *Nanaimo County.*

Both vessels were purchased through the Canadian Maritime Commission, from the Acadia Overseas Freighter Corp., of Halifax, N. S. They have accommodations for 12 passengers each.

The *Tel Aviv* had been in active service up to the time of purchase in August, and comparatively little work was needed to ready her for service. The hull was sandblasted to bare steel from the keel to the water line, and the entire vessel repainted inside and out. The cargo holds were put in first class shape, cleaned and repainted, and miscellaneous voyage repairs were made.

The acquisition of the SS *Tel Aviv* by the Israel America Line Ltd. brings the total of the Israel Merchant Marine strength to twenty vessels. Two, the SS *Haifa* and *Tel Aviv,* are operating between Israel and the United States. The other eighteen are serving Europe and Africa.

The *Tel Aviv* and the *Haifa* are named after Israel's two ports, Tel Aviv and Haifa.

A painter (at the right) puts finishing touch to the new name of the former Canadian-Victory ship, "Hants County," now the "Tel Aviv," second flagship of Israel, readied for service by Todd's Hoboken shipyard.

Testing Cargo Booms

A mobile hydraulic test unit, designed and constructed at the Seattle Port of Embarkation, is now being used to weight-test cargo booms at a large saving in money, man-hours, and use of equipment.

The testing device, which was designed by Harold Webb, Superintending Marine Engineer, Seattle Port of Embarkation, is believed to be the most compact type of its kind, and the only one mounted on wheels, in existence.

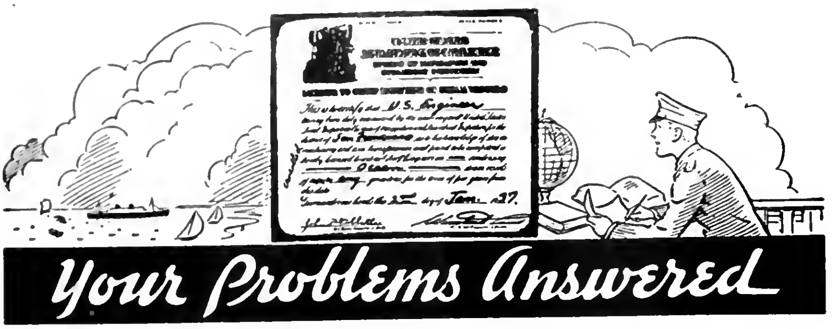
Prior to the use of the hydraulic test unit the lifting capacity of cargo booms was tested by weights which involved use of a crane and ten men working two days at an estimated cost of $960. With the new device it takes three men six hours, costing approximately $72. In addition, the use of the crane and troublesome weights has been eliminated.

The test unit operates by registering on a gauge the amount of lift tonnage exerted on the boom when a line from the boom is fastened to a steadfast part of the ship.

The unit is thought to be the only one now in use by the Army. In 1939, when Webb was a Navy commander stationed in San Francisco, he constructed a similar unit which he believed to be the first one in existence.

Donald R. Head, left, an American Bureau of Shipping surveyor, and Harold K. Webb, right, superintending marine engineer, Seattle Port of Embarkation, inspect the device invented by Mr. Webb for testing the strength of ship's booms. Successful tests were taken aboard the U.S.A.T. "James O'Hara." Cylindrical object in rear is the ram which connects with test gage.

U. S. Army Photograph



by "The Chief"

"The Chief's" department welcomes questions—Just write "The Chief," Pacific Marine Review.

Slide Rule for Engine Room Officers

"MAC" McCOY, the first assistant engineer of the S.S. *Marine Reviewer* was in the chief engineer's office talking to one of the oilers. An Irishman with an unusually strong and flavorful brogue, his speech was, however, sharp, witty and to the point, when addressing juniors.

"And I keep telling ye agin and agin, that when ye change them burner tips fer cleanin, ye must look at the burner tip number very carefully and see that ye put the same numbered burner tip back in that ye took out, ye see, that means that the same size goes back in that came out. They come in different sizes, ye know, er do ye? Now last night following your watch they smoked for hours before they discovered one burner tip two sizes too big for the speed we wus running. Now begone wid yiz below. Get your life jacket. There will be a boat drill in four minutes and I have just a hunch they will be lowering your boat this time and no monkey business."

"Yes Mr. McCoy, I understand; but I still can't tell a 6 from a 9 on them tips. Yes, sir."

The general alarm rang and the mournful blast of the whistle announced boat stations.

Following the drill Chief Engineer Frank Farran and McCoy assembled in the office. McCoy opened the conversation as though it was a continuation.

"And also what do you want to fill that young third assistant with all that stuff about a slide rule for. He will never use it."

Farran hesitated a moment and replied.

"Mac, I'm telling you, I firmly believe that there is no limit, no limit whatever, to the capacity of the human brain to absorb information of any kind or classification. The real limit to our knowledge is our willingness, our will, to read, listen open minded, study, ponder and puzzle over things. If George Cambell will learn to think, and he is learning, he will educate himself. —Besides how do you know but that he may be your Port engineer sometime or an estimater in a shipyard or what not. He is willing to listen, I am willing to talk, and we both learn. Where does that leave you?"

Mac grinned. "Sure I know. I learn guys things too. I showed that oiler a thing or two this morning; he couldn't tell the difference between a 6 and a 9, on them burner tips."

A knock on the partly open door caused them both to look up.

"Come in Cambell," Farran said. "Sit down. We were just talking about education. What's on your mind?"

"Well Mr. Farran, sir, you remember, on the last trip you said you would show us how to make a slide rule. Well you never did, sir."

"Mac here says you will never have occasion to use it so why learn it, George. So what do you say to that?"

"I want to learn about everything in engineering, and I know the slide rule is a tool that engineers use." George's eyes brightened with the burning ambition.

"Professional engineers use it all right," Frank answered. "But I doubt if watch engineers will need it much. They sometimes even forget their simple arithmetic."

"But, sir, I do not want to go to sea all my life. I want a shore job some day and will need to know a lot more than I know now.

"Does that answer satisfy you, Mac?" Farran asked. Then, turning to George, "Well, here's the paper and pencil, here's the blackboard, here's the logarithm tables and here's the scale divided into tenths and hundredths. Are you ready?"

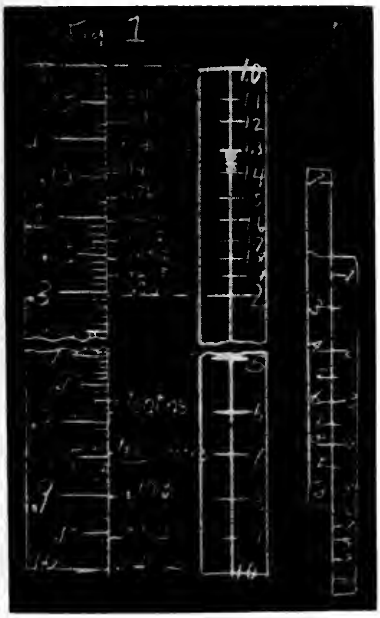
"Yes, sir" George exclaimed as he pulled up closer to the blackboard.

Farran continued. "First, we will make one on paper, a simple one to get practice. Then you can make one in wood a little larger, and finally you can carve out one on plastic or ivory. But to get the really accurate one it is necessary to have special machines to graduate the fine lines on the rule accurately. Our free hand accuracy will be limited by our ability to measure distances on the paper to small fractions of an inch.

"We decide how long it is to be. This will be determined by the scale

we will use to measure with. You see, fundamentally we will want to divide whatever length of rule we decide on into ten equal parts or tenths. Then each tenth will divide into ten equal parts which will be hundredths of the whole. Then each hundredth will divide into ten equal parts which will be thousandths of the whole. This makes the scale by which we will calibrate the slide rule. *(Left Fig. 1)* We are sketching it on the board, showing only the two ends of it to be able to make a large drawing. The middle is shown as broken out.

"Now" he continued, "we select the paper on which the rule is to be laid out. We draw a line down the middle because this is the line along which we will later cut to make the two parts of the slide rule so that one part can slide on the other. This also is shown as broken to get a larger view of it on the board. *(Fig. 1, right)*



"We then lay the scale, left in the figure, on the middle line of the paper, write in the figure and locate the zero where we want the slide rule end to be. We are now ready to mark off from the scale to the paper the several scale readings that we will get from the logarithm table."

Frank then took up the log table and wrote on the board several figures. *(Fig. 2)*

"Now here copied from the log table are the mantissa of the logarithms of the numbers from 1 to 10. Reading the numbers on the scale we mark corresponding places on the paper across the middle line and mark these places with a fairly long line across and with the number which corresponds with the measurement. *(Center Fig. 1)* We mark up the numbers, and the 10 mark determines the end of the slide rule. In Fig. 1 we draw lines across between the paper and the scale to show which scale reading corresponds to the numbers.

"To increase the accuracy of the rule we will subdivide the space between the numbers. Take for instance between 1 and 2. A table in Fig. 2 shows the mantissa of the logarithms of the numbers between 1 and 2. We lay these off on the paper as shown in Fig. 1. In like manner we do the same to the numbers between 2 and 3 and between 3 and 4 and so on. The subdivision is shown in the figure for the numbers between 8 and 9.

"Our slide rule is still not accurate enough. We must make at least one more subdivision. This one will take ten times the work of the last. We tabulate the log mantissa for the numbers between 1.3 and 1.4 in Fig. 2. These measurements are so fine that we have difficulty in laying them out, let alone reading them on the scale. But we do the best we can. When we come to the sub-subdivisions of the larger numbers like between 6.6 and 6.7 we will do well to be satisfied with locating only the 6.65 and then the 6.75 and 6.85 and so on. This inability to read a scale to thousands or to ten-thousands at best is the limiting feature of the slide rule and the source of its error. If we want answers to problems of multiplication and division to more that three significant figures we cannot use the slide rule but must do them long hand.

"Having divided the paper into hundreds of subdivisions we now cut it down the middle and have two rules, one of which we can slide along the other. *(Shown at the right of Fig. 1.)* If we now place the index or end of one on the figure 2 of the other, then any number on the other is twice the value of the number above it on the first scale. By sliding the rules back and forth we get any combination of products. And if we can get products we can also get the results of division by reversing the process for getting the products." Frank stopped and waited

for someone to say something.

"Hey, wait a minute," McCoy shouted, his eyes wide open. "You showed us the same scheme of using two rules to add only a month ago and now you tell us that it multiplies. Which is it, addition or multiplication?"

"Yes, Mr. Farran, I remember you said we could add that way but now your sketch shows multiplication." George Cambell's voice was confident but his look indicated a little worry for Farran's reputation of always being right.

"Well, so I did, fellows, and you are quite right; with the ordinary calibration on scales they will add, when put together *this* way." Farran continued. "But you remember we calibrated these scales to the logarithmatic table, and not to a uniform or linear counting table. Does that make a difference? Remember you add logarithms to multiply the corresponding numbers."

"I knew there was some kind of a trick in this monkey business. I might have known that you would have an answer, right or wrong though ye be. Still in a way it does sort of make sense in view of all

(Please turn to page 67)

Sales Tax Exemptions In California Shipbuilding

By GEORGE R. REILLY
Chairman, State Board of Equalization

CALIFORNIA'S shipbuilding industry, in precarious health since the close of the war, has been given substantial encouragement in the form of exemption of its products from sales tax when they are to be used in interstate commerce or deep sea fishing.

The new law was introduced by Assemblyman Thomas A. Maloney of San Francisco on March 21, and signed by the Governor on July 25, 1949. It reads as follows:

> "There are exempted from the taxes imposed by this part the gross receipts from the sale of and the storage, use, or other consumption in this state of watercraft for use in interstate or foreign commerce involving the transportation of property or persons for hire or for use in commercial deep sea fishing operations outside the territorial waters of this state, and any sales of tangible personal property becoming a component part of such watercraft in the course of constructing, repairing, cleaning, altering, or improving the same, and charges made for labor and services rendered in respect to such constructing, repairing, cleaning, altering or improving."

The exemption is intended to place California on an equal competitive footing with the state of Washington, where a similar sales tax exemption has existed since the first of May, and with Oregon, where there is no sales tax. The measure was adopted by the legislature at the behest of California shipbuilding, labor and shipping industry representatives.

The new law confronts the State Board of Equalization with several problems of interpretation and administration. The major problem of interpretation apparently arises out of the statute's limitation of the exemption to watercraft used *for hire* or in deep sea fishing. It is contended by several of those who were instrumental in securing passage of the act that the intention was to leave only pleasure vessels subject to tax. Whether such a legislative intent can be read into the words of the law is a question which has been placed before the Attorney General. If not, then the sale of an oil tanker to an oil company to be used to transport its own crude oil or petroleum products and like transactions will remain taxable.

In the event the latter type of transaction is to be taxed, the Board will not find it altogether easy to separate the taxable from the nontaxable. When a vessel is purchased, its use by the purchaser is not always predictable. However, this problem is not without precedent in the sales tax field. There are other areas in which the purchaser's intent has tax consequences and where actual use after purchase may shift the transaction from an exempt status to a taxable status or vise versa.

Much the same problem arises from the restriction of the exemption to vessels used in interstate or foreign commerce or for fishing outside the territorial limits of the state. No one can tell for certain at the time of purchase whether a vessel is going to be used in interstate commerce or in intrastate commerce.

If the purchaser buys a vessel with the intent to use it in interstate commerce but then decides to use it in local commerce, he will simply have to pay the tax at the time he puts it into service, and it will be up to the Board's investigators and auditors to see that such cases are reported.

Since the legislature did not require *exclusive* use of a vessel in the favored activities in order to confer tax immunity on the sale or usage, the Board, in consultation with the Attorney General's office, has adopted a rule that predominant use is controlling.

Thus the sale of a vessel which is to be used predominantly but not exclusively in interstate commerce is held to be exempt.

Nor does a fisherman have to refrain from picking up an occasional fish this side of the three-mile limit for fear of becoming liable for a tax on his vessel.

Can the sale of a vessel which is never to go beyond the territorial limits of the state be exempted under the new law? It can, the Board's ruling states, if the vessel is to be used primarily to carry goods or passengers on one leg of an interstate journey,

Thus a car ferry operating across San Francisco bay might qualify for tax-exempt purchase. Similarly, the sale of a tugboat engaged principally in maneuvering ocean-going vessels into harbor and out again will be exempt under the Board's ruling. This interpretation follows a long line of Supreme Court decisions on the "commerce clause" of the U. S. Constitution.

Not only sales of watercraft themselves but also sales of any tangible personal property becoming a *component* part of the watercraft are now tax exempt.

The reason for extending the exemption to component parts is not hard to discern: If a shipbuilder can sell a complete vessel free of sales tax, then those who are selling items to be added to a hull should be able to do so without collecting sales tax.

But the exemption clearly does not extend to all tangible personal property used on a vessel. It applies only to that which is affixed to the vessel. Obviously it is impossible to list all the things which may or may not

become component parts of a vessel, but examples will spring to the mind of any reader.

The Board's ruling, which is reproduced in full below, is intended to be illustrative and not definitive in this respect.

The ruling will be supplemented upon receipt of the Attorney General's opinion on the meaning of the words "for hire" as used in the statute. Here is the ruling, as adopted by the Board Members on October 6, 1949:

SALES AND USE TAX RULES AND REGULATIONS, Ruling No. 51.5.

Watercraft, Reference: Section 6368:

The tax does not apply with respect to watercraft used in interstate or foreign commerce involving the transportation of persons or property for hire, even though the watercraft operates between termini within the state, such as ferry boats operating entirely within the State but transporting interstate passengers or cargo and barges or tugs that operate entirely within the State convoying or aiding the departure or arrival of vessels to or from points outside the State.

The tax does not apply with respect to watercraft that make voyages both in interstate or foreign commerce and voyages that are exclusively in intrastate commerce provided the principal use of the watercraft is transportation for hire in interstate or foreign commerce. The tax applies with respect to watercraft making voyages both in interstate or foreign commerce and voyages that are exclusively in intrastate commerce where the principal use of the watercraft is in intrastate commerce.

The tax does not apply with respect to watercraft used in commercial deep sea fishing operations outside the territorial waters of this State if the principal use of the watercraft occurs outside the territorial waters of this State. The tax applies with respect to watercraft used in commercial deep sea fishing operations if the principal use occurs within the territorial waters of this State.

The tax does not apply with respect to tangible personal property becoming a component part of watercraft for use in interstate or foreign commerce involving the transportation of persons or property for hire or use in commecial deep sea fishing operations outside the territorial waters of this State in the course of constructing, repairing, cleaning, altering or improving the same.

There is exempted under the definition that property which is an integral part of the boat affixed or attached in a substantial manner when in use.

Included in the tangible personal property subject to the exemption are the following:

The hull and all affixed property constituting an integral part thereof.

All property affixed or attached to the structure of the watercraft used while thus affixed or attached for navigation or operation such as; radio transmitters, receivers and other radio equipment, radar equipment, intercommunications systems, winches, anchors, lifeboats, engines, generators, switchgear, compasses, indicators, levers, control and signal systems, lamps, chains and cables.

All property affixed or attached to the structure of the watercraft used while thus affixed or attached for the comfort or convenience of the passengers and crew, such as; built-in bunks, furniture attached by bolts, screws or otherwise, including counters, shelves, stools, railing, stairs, partitions, doors, windows, window shades and curtains, awnings, harware, stoves, sinks and other plumbing fixtures, and paint.

The tax applies with respect to all items of property of a kind commonly treated as expense items and which is not affixed or attached to the vessel while in use. Included in the tangible personal property not subject to the exemption are the following:

Portable equipment, furniture, devices and other property such as chairs, deck chairs, table or floor radios, table of floor lamps, dishes and other utensils, tables, bedding, linen, mattresses, cots, athletic or recreational equipment (not affixed or attached), pictures, fire extinguishers (portable), tools, brooms, mops, rags, towels, oil, grease, soap, cleaning materials and other consumable supplies.

The foregoing lists of taxable and nontaxable items are illustrative only and do not constitue complete lists of articles in either category.

Slide Rule for Engine Room Officers

(Continued from page 65)

the other stuff ye told us." McCoy seemed pleased with himself. "I saw one of them things in a store in Yokahama last trip for only three yen and I spent ten times that much in the Sailors Club on the waterfront. Now if I had only had one here now I could show you two guys how to use it."

Farran reached into the side drawer of his desk and withdrew a beautiful sixteen inch slide rule just covered with all kinds of scales on both sides and looking a lot different from the simple sketch. "Well now Mac, I think we can accommodate you all right. This one cost eighteen dollars but perhaps you could demonstrate on it in spite of the cost."

McCoy took the slide rule, turned it over and over and laid it down on the desk. "There've been too many changes in these things since I learned about them and I haven't kept up to date."

Farran smiled. "Yes, there have been improvements. This system of scales on this rule was first used 125 years ago and prior to that they were simpler. You must have learned the older types 150 years ago."

Missing the joke, Mac continued. "But I can figure longhand as fast as the best of them on them slide rules."

"Thanks a lot, Mr. Farran. I will get one of the less expensive kind when we get back to port and practice a lot on these problems in the correspondence course." Cambell was very pleased at finally understanding what to him was a great mystery.

Pacific WORLD TRADE

Reg. U. S. Pat. Off.

Current World Trade Data

The following current information concerning trade with foreign countries is quoted from the Foreign Trade Bulletin of the American National Bank of Chicago through the courtesy of A. M. Strong, vice president. Complete details regarding any matter mentioned can be obtained from their Foreign Department. While the data has been compiled from sources which they consider reliable, it is disseminated without responsibility on their part.

SINCE September 18, 1949, thirty countries have devalued their currencies in relation to the dollar. Australia, Denmark, England, India, Israel, Ireland, Netherlands, New Zealand, Norway and Sweden have reduced the value of their monies by approximately 30%; Argentina, by 46%; Belgium, by 12.3%; Canada, by 10%; Greece by 33%. France, Italy and Switzerland have abolished official exchange rates and all transactions with those countries can now be settled at lower free market rates.

It is too early to appraise the effect of the devaluation on American exports, imports and domestic business. The monetary changes will have repercussions in this country. The increased cost of American goods in devalued countries and the lowering of European prices will adversely affect American exports. The reduction in the cost of European goods will create keener competition in the American market.

While the immediate effects of devaluation may be detrimental to our exports and to certain American industries, the measure may eventually enable European countries to earn more dollars for their needed purchases in the United States and result in a balanced interchange of goods between other nations and this country.

Argentina

In accordance with regulations of the Argentine Customs, importers are allowed a period of 15 days from date the carrier is given official entry to a port, to initiate clearance of the merchandise through the Customs. Failure to make the declaration within the stipulated time results in a 2% fine on the Customs valuation of the goods.

As banks are not registered importers, they cannot initiate clearance of the goods but they can make the declaration in their name. It has been the practice of banks in Argentina to make this declaration in cases where the documents had not been taken up by the drawees at the end of the 15-day period and the value of the shipment exceeded US$500.

Upon declaring merchandise in their name, the banks must sign an undertaking assuming responsibility for the immediate reshipment of merchandise not covered by an import permit. They also become liable for all expenses incurred in connection with the merchandise.

In the face of these new regulations banks in Argentina are reluctant to automatically declare merchandise in the Customs in their name. They, however, perform this service in cases where they receive express instructions to do so together with the American banks undertaking to remain responsible for any and all expenses that may be incurred by them as a result of the declaration. They also require specific instructions regarding insurance protection of the merchandise.

Brazil

Brazilian Exchange Authorities issued on August 12, 1949, circular No. 186, setting forth the following regulations:

1. Once applications for opening credits have been approved, no alterations may be made without previous consultation and approval by the Fiscalization Authority.

2. At present, credits are authorized only for payment against delivery of regular shipping documents and for maturities coinciding with licenses previously granted by the Carteira de Exportacao e Importacao (when required); clauses for payment against simple receipt, manufacturer's certificate or similar documents are not permitted.

3. Inasmuch as credits may be opened only if the corresponding exchange is closed at the same time, deposits in cruzeiros in the form of a special account subject to subsequent application of the funds to future

imports are prohibited, since such desposits would represent actual opening of credits under open exchange which is contrary to existing regulations.

Chile

Under a Chilean Government decree issued on August 11 the following items were transferred from the official exchange category of 31 pesos to the dollar to the bank market rate of 43 pesos to the dollar: crude petroleum, fuel oil, gasoline, lead, zinc, tin, coke, and authracite, cotton yarn, caustic soda, paraffin wax, paper pulp except cellulose. Chilean banks will reserve 60% of foreign exchange which will become available for imports at a 43 pesos rate for the above commodities. 30% of such exchange will be reserved for a second list of about 75 products and 10% for a third list of about 100 products.

Colombia

Exports, imports and foreign exchange in Colombia are subject to Government control. All exports from Colombia are subject to license, granted on condition that the exporter guarantee to return the foreign exchange proceeds to Colombia and exchange them at authorized banks.

Foreign exchange proceeds derived from the exportation of coffee, bananas, cattle hides, silver, platinum, jewelry or other articles elaborated with gold, silver and platinum; precious stones, cattle, meat, plain textiles and products of national fabrication in which production foreign raw materials are used, in a proportion greater than 10%, must be exchanged for certificates ("titalos") representing the amount of the foreign money, within 30 days from the date of approval of the respective export licenses. These certificates may be exchanged for local currency at only authorized banks at the official rate.

The foreign exchange proceeds of all other exports must be exchanged at an authorized bank for "certificates of exchange," which may be used in making payments abroad for certain specified transactions, and may be bought and sold in the free market in Colombia.

All Colombian imports are classified as either Group I, "essential;" Group II, "less essential;" or Group III, "non-essential." Most available exchange is being allocated to payments for imports included in Group I.

At present, licenses are being issued for imports included in Group I only. Moreover, the issuance of licenses is being restricted in the case of certain items included in Group I which are also available from national sources, although in quantity or quality inadequate for the entire country's needs.

Special "non-reimbursable" import licenses are granted to provide for the importation of such items as traveller's luggage and also for the importation of specified "capital" goods.

Exchange tax schedule:

4% *stamp* tax is levied on all exchange remittances, except those for Colombian diplomats, foreign technicians, and travel and maintenance of students and persons traveling for reasons of health.

6% *exchange* tax is levied on exchange remittances for Group I merchandise, and for motion picture and artists' fees.

12% *exchange* tax is levied on exchange remittances for Group II merchandise.

26% exchange tax is levied on exchange remittances on Group III merchandise.

34% tax is levied on exchange for general travel purposes and for remittances to residents abroad—made up from the 4% *stamp* tax and a 30% resident's *remittance* tax.

Leaflet describing Colombian exchange and import controls can be obtained from the Regional Office of the United States Department of Commerce.

France

The French Ministry of Finance raised on August 20 to 60,000 francs, the amount of notes that may be imported by foreign travelers.

The list of specified goods for which Import Buyer Authorizations are obtainable has been extended to certain raw materials and semi-finished products for industries. The list of new materials has been published in the "Foreign Commerce Weekly" of September 12, 1949.

The formalities to be observed by importers in France holding licenses for imports to be financed under the European Recovery Program have been assembled in a single text under Notice to Importers and French Exchange Office Notice No. 404 published in the French Journal Officiel of June 9, 1949.

It is no longer required that contracts or commercial documents replacing such conrracts be deposited by the importer with an authorized bank for transmittal to the Credit National and thence to ECA. Instead, the supplier must now draw up an invoice and contract abstract on the reverse side of ECA form No. 280 which must be attached to the file submitted for reimbursement.

Secondly, the Credit National in Paris, acting as "authorized applicant," will now certify PRE forms, and, as a consequence, French banks will open irrevocable rather than conditional credits, as in the past, with United States banks.

Holland

The Dutch Government is starting an active campaign to promote exports to the United States and Canada. Beginning with September 7, 1949, 10% of the net dollar proceeds collected from the United States and Canada on export transactions will be made available to Dutch exporters for promotional expenses in the United States and Canada of their exports. Four new Trade Commissioners will be appointed, one for Chicago.

Netherlands Minister for Foreign Affairs announced that the Government would extend all possible help toward organizing exhibits of Dutch products in the United States.

Japan

According to an announcement by SCAP, Japanese exporters may appoint overseas agents to handle the marketing of goods abroad. The agents will receive payments of foreign exchange derived from the sales of exports in accordance with the newly established plan.

New lists of Japanese products available for exportation from Japan and of items programmed for importation into Japan as of July 1, 1949, have been received by the Department of Commerce from SCAP (Supreme Commander for the Allied Powers). Copies of these lists, which do not contain quantitative data, may be

obtained from the Field Offices of the Department, or from the Far Eastern Branch, Office of International Trade, Department of Commerce, Washington 25, D. C.

SCAP announced a liberalization of export procedures on contracts valued less than $50,000.

In the future, standard forms will not be required for contracts in which cash payment is made through letter of credit. The seller will be required, however, to furnish the original signed letter or the cable and a summary of the essential terms of the contract when applying for an export license. Contracts under the new procedure still require the approval by the Japanese Ministry of International Trade and Industry and validation by SCAP, as in the past.

Italy

According to a decree issued on September 20 by the Italian Government, the average rate (50% official and

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Small Business and the Marshall Plan

Administrator Paul G. Hoffman has announced details of the program to provide American small business firms with greater opportunities to share in Marshall Plan business.

The program, when completely in operation, will provide small independent firms with:

1. A counseling service in exporting under the Marshall Plan.
2. Information of potential purchases to be made in the United States.
3. Names and addresses of European importers and the products they have purchased under the Marshall Plan.
4. Information regarding commodities which offer the greatest opportunities for sales in Western Europe.
5. Finally, a directory will be compiled listing names and addresses of potential American exporters, by commodities. This directory will be for overseas distribution and will be available through ECA overseas missions to European importers seeking additional American sources of supply.

To further assist small independent enterprise, ECA has added to the Procurement Authorization forms a new provision calling the attention of Marshall Plan Countries to the commodities and services afforded by small American business firms. The amended Procurement Authorization forms will contain the following sentence:

" . . . procurement of commodities and services under this procurement authorization should, insofar as practicable, be made in such a manner as to include among the suppliers thereof, American small business firms which can furnish commodities and services of a comparable quality at prices and terms of delivery which are competitive."

Latin Collections Improving

The number of Latin American collections paid promptly during September increased from 50.7% to 60.8%. The total dollar amount of outstanding collections also continued to decline. A decline in the number of payments made was shown during September and was particularly sizable in the case of Brazil and of Colombia.

—U. S. Dept. of Commerce, 11-3-49.

Junior Traders Discuss Port Problems

"What Can Be Done to Improve the Port Situation and Bring More Business to San Francisco?" was the formidable title of a special panel discussion presented at the October 5 meeting of the Chamber's Junior World Trade Association held at the Union League Club. Pictured in the panel above are, left to right: M. A. Cremer, manager, Marine Exchange; A. A. Moran, director of traffic and operations, Parr-Richmond Terminal Company; James S. Kearney, president, Local 10, I. L. W. U.; G. A. Gumbrecht, president of the World Trade Association of the Chamber; Edward A. Myers, president of the junior traders' group, who presided at the meeting, and John F. Wagner, vice-president and general manager, Pacific Far East Line. Also participating in the panel but not shown were T. R. Jamieson, president of Otis, McAllister and Company and Walter Nelson, business agent of Local 10, I. L. W. U.

Export Credit Information on Latin American Countries

THE FOLLOWING is an excerpt from a release of the Federal Reserve Bank of New York, dated September 20, 1949:

"During August two indications of improvement occurred in the Latin American export collection experience of the 15th monthly reporting banks: a decline of 4.7 million in the dollar amount of outstanding export drafts on Latin America and an increase of 4,851 items in the number of drafts paid during the month. These developments are significant because the upward trend in the dollar amount of outstanding collections was reversed for the first time in nine months and the total number of drafts paid, at 21,134, was the largest in the same nine-month period.

"In the case of both developments, Colombia and Brazil accounted for most of the change. The number of drafts on Colombia paid during the month increased by 2,657 items to 3,177, the largest number paid by Colombia in any month since these reports began. Of the total number of Colombian drafts paid during August, only 37.1 per cent were paid over 90 days slow, compared with 70.9 per cent during July. Furthermore, Colombia reduced the dollar amount of its outstanding draft indebtedness by 4.1 million dollars to 7.7 million. This reduction in the dollar amount of collection items not yet paid, as well as the increase in the number of drafts paid during the month, are the result of a good volume of Colombian coffee exports to the United States at high price levels and of the continuance of the exchange control authority's policy of strict curtailment of import licenses. In the case of Brazil, the number of export drafts paid during the month increased by 1,410 items to 2,895, and of the total number paid, 96.6 per cent were in the over-90-days-slow category. This indicates that Brazil is making progress in the liquidation of long outstanding collection items. For the first time in almost a year, there was a slight decrease during the month in the dollar amount of outstanding export drafts drawn on Brazil. This may indicate that the new licensing procedure that the Bank of Brazil inaugurated in July has succeeded in arresting the upward trend on Brazilian draft indebtedness.

"The countries in Latin America that paid their dollar collections most promptly in August were Cuba, Haiti and Panama. In all of these countries more than 80 per cent of the collections actually paid were prompt.

"The downward trend in the dollar amount of outstanding confirmed letters of credit was halted during August. These unused credits increased by 3.8 million dollars to 134.0 million, a level only slightly lower than that of June 1949."

Collections Paid, Collections Outstanding, and Confirmed Letters of Credit Outstanding August 31, 1949, as Reported to Federal Reserve Bank of New York by 15 Banks

(12 New York City Banks and 3 Banks Outside the Second Federal Reserve District):

		Collections paid* during August; per cent of total number of items					Outstanding Aug. 31, 1949 (In thousands of dollars)	
Country	Schedule of Prompt Payments	Prompt	Up to 30 days slow	31 to 60 days slow	61 to 90 days slow	Over 90 days slow	Collections*	Letters of Credit Confirmed
Argentina	2 mos.	9.3	3.1	6.2	4.9	76.5	18,486	41,603
Bolivia	2 mos.	64.3	21.1	8.5	3.1	3.0	1,334	2,604
Brazil	6 wks.	0.8	1.2	0.7	0.7	96.6	114,405	15,475
Chile	2 mos.	52.2	28.2	11.9	1.8	5.9	3,246	6,129
Colombia	7 wks.	4.1	7.3	20.5	31.0	37.1	7,736	8,029
Costa Rica	2 mos.	66.0	6.0	2.0	6.0	20.0	2,483	811
Cuba	3 wks.	82.1	11.0	3.9	1.2	1.8	4,036	8,712
Dom. Rep.	1 mo.	64.8	14.1	8.4	3.0	9.7	511	1,339
Ecuador	6 wks.	71.4	12.5	5.8	4.1	6.2	1,599	1,270
El Salvador	1 mo.	46.0	25.3	14.8	6.4	7.5	948	415
Guatemala	6 wks.	58.1	21.9	11.9	4.2	3.9	944	544
Haiti	1 mo.	84.4	5.7	4.8	1.8	3.3	269	195
Honduras	1 mo.	46.7	25.9	12.5	5.5	9.4	795	195
Mexico	1 mo.	78.5	11.3	4.8	2.5	2.9	3,265	19,934
Nicaragua	6 wks.	77.2	8.1	5.2	3.8	5.7	399	77
Panama	1 mo.	84.9	9.2	3.6	1.1	1.2	897	1,960
Paraguay	2½ mos.	63.7	22.5	8.7	1.3	3.8	752	360
Peru	2 mos.	64.4	15.9	8.1	4.2	7.4	4,258	2,837
Uruguay	2 mos.	62.7	11.9	8.8	2.6	14.0	1,019	4,534
Venezuela	6 wks.	66.3	17.0	7.8	3.4	5.5	12,132	15,933
Br. Guiana	6 wks.	66.7	10.0	3.3	......	20.0	22	....
Dut. Guiana	5 wks.	76.3	9.7	2.6	1.8	9.6	145	328
Fr. Guiana	5 wks.	.....	50.0	50.0	.....	...		...
Other West Indies	6 wks.	75.7	14.5	5.6	2.1	2.1	933	738
Total 8/1949 15 Banks		50.7	11.9	8.0	6.8	22.6	180,614	134,022
Total 7/1949 15 Banks		63.6	13.3	5.7	2.4	15.0	185,278	130,230
Total # 8/48 12 N.Y.C. Banks		49.7	14.0	9.4	6.3	20.6	113,796	190,383

*"Collections paid" are drafts (both sight and time) for which payment was received in the United States during the month. "Collections outstanding" are drafts sent out for collection for which payment had not yet been received in the United States at the end of the month.

Excludes Other West Indies.

The Pakistan Rupee in the Devaluation Picture

By JAHID HUSSAIN

Governor of the Pakistan State Bank

EDITOR'S NOTE: It is obvious that currency devaluation affects each country and each product of each country in a manner peculiar to itself. If, in the rush to obtain quick benefits from devaluation, the economy of a country became adverseiy affected, the re-valuation of the country's currency would have to be considered before long.

The case of Pakistan, which did not devalue, illustrates the opposing economic forces at work in one country. Such a country, regardless of its need for the benefits of soft currency or of its placement in the Sterling area, can scarcely afford to devalue its currency and thereby practically shut off its importations when such importations are vital to its industrialization program. For the presentation of the detailed argument, we publish the following summary of a speech by the governor of the Pakistan State Bank.

THE Government of Pakistan gave anxious consideration to the question whether the Pakistan rupee should or should not be devalued. They considered every aspect of this difficult problem in order to arrive at a decision which, while being primarily in the interest of Pakistan, should also be in harmony with the main object with which devaluation has been undertaken by the United Kingdom.

Devaluation was not indicated as the remedy for any of the economic ills from which the country suffers. We have had an unfavorable balance of payment but this was due to causes of a temporary nature arising out of the partition of the country and due to our trade and payment position with India being still far from clear. Our temporary disequilibrium did not justify the drastic remedy of devaluation. Most of the countries which have devalued their currencies had to remedy a permanent disequilibrium with the hard currency areas.

The export products of Pakistan are not readily capable of expansion, and devaluation would not have achieved its main object of increasing the sales in dollar areas. In fact, devaluation would lead to a net diminution of earnings. On the other hand, imports would increase in prices, thereby causing an additional drain on the already diminished earnings of foreign exchange. Devaluation would thus have tended to create precisely that situation for which it is considered to be the sovereign remedy.

Pakistan is a predominantly agricultural country and is in need of industrialization. Devaluation would have placed the hard currency area beyond its reach which is a cheap and ready source for capital goods. Prospects of industrialization of our country would have receded further.

The country has suffered in the past from severe inflationary conditions, which in recent months have received a check. In East Bengal, however, conditions continue to be severe and generally speaking the cost of living is still oppressive. Prices of food and other consumer goods are high. The prospect of a further increase in prices which would have resulted from devaluation could not be contemplated. The decision not to devalue the Pakistan rupee would tend to bring about a fall in prices, thereby contributing towards the well-being of a sorely oppressed part of Pakistan's population. The conditions of East Bengal have been specially in the minds of the Government in arriving at their momentous decision of far-reaching implications not to devalue their currency. It is confidently hoped that conditions of living in East Bengal will register a change for the better in the near future, while Pakistan as a whole will avoid the evils of a fresh dose of inflation which would have followed from devaluation.

As you know, the prices of our products have been high in recent years and a downward adjustment has been indicated for sometime in the interests of our own country and for retaining and developing our markets. Large monetary incomes of comparatively smaller sections of our population have led to a distortion of our economy, while the incomes themselves have been of little benefit to those who have earned them. They have been consumed by the high prices of food and other articles of consumption. The loss which will follow from an adjustment of the prices of our export products will, we hope, be made up by the fall in the cost of living which can reasonably be expected. In arriving at their decision the Government have considered the interests of Pakistan as well as of the sterling area of which she is a member.

Under a courageous and wise Government the economy which will result from the policy of Government will create conditions favorable for development. Promotion of productive enterprises, which will help the Balance of Payment position will be beneficial to our country and mitigate the undesirable consequences which are likely to follow from a deflationary policy.

I wish to tell you that the decision of the Government is firm and final. There is no question of going back upon it. Let none of you take any action under the mistaken belief that the decision will be reversed. The Government have taken a decision and are determined to enforce and abide by it. It is not aimed against any country, much less India with which we have close economic relations. Pakistan is anxious to sell her products to India and to purchase her products, both at reasonable prices. Pakistan is a member of the Sterling Area and has no intention of leaving it. On the contrary she wishes to do whatever she can to strengthen the position of Sterling Area and believes that in deciding not to devalue her currency she has acted in her best interests and those of the Sterling Area.

All changes involve a period of adjustment, often causing hardships and distress to many. We as citizens of Pakistan should be ready to face hardships in taking the country through stormy seas to tranquil waters.

Marine Insurance—

Salvage of the Tuna Clipper

By DAVID W. DICKIE

WHEN A TUNA CLIPPER meets with an accident it usually assumes one of the following forms:

1. The vessel gets too close to the shore, touches bottom and damages the hull.
2. In one of the harbors she runs on a sand spit, heels over and fills the engine room through one of the wing athwartship doors.
3. She has been in collision with another vessel and has suffered topside damage.
4. Machinery failure—the engine getting out of line due to bending of the hull.
5. Engine failure such as clutch trouble.
6. Loss of a propeller at sea causing a frantic call for help.
7. Leaking walls can be annoying at times although not particularly dangerous as the bilge pump drains the leakage overboard.
8. Fire has caused a casualty on several vessels.
9. Explosion is usually limited to the smaller vessels.
10. Several of the vessels have foundered but largely in the Portland and Seattle Districts.
11. The vessels that have capsized have been those that were too narrow when built. They have been confined to vessels built during the war and are government surplus. Also they have been vessels that are subdivided incorrectly and have the characteristic of being overloaded when a number of the compartments are filled.
12. The vessels that have disappeared have been largely confined to the Ketchikan District.

The first thing is to get the vessel off the shore as soon as possible so the sea will not break her up. An examination will disclose whether the boat can be floated without sinking and if so it usually means that some sort of a rig must be devised to tow her off.

Just in case she is not sufficiently tight to be safe for towing any distance, it is wise to fill all vacant spaces in the vessel with empty drums. A lighter on each side is advisable on occasion with chains under the keel to help keep her afloat. Experience has shown that any rig for towing a vessel off the shore has to be designed for more than one purpose. The most logical is to plan on using the device for lifting around the harbor where it will be available most of the time and only semi-occasionally taken to sea for performing the salvage operation. A rig that is suitable for the work is a barge about 100 feet long, 48 feet beam and about 13 feet deep outside measurements. It should have three bulkheads fore and aft and four bulkheads athwartships with stringers between both ways. It could be made of steel if cost were not to be taken into account.

On the barge is mounted a four legged "A" frame

with a five foot forward lean to the peak of the "A" frame and a boom for hoisting.

Quarters for the crew are arranged in the hold of the barge with heating, lighting, electric cooking, and sanitary facilities.

The barge should be divided for water ballast in case of necessity.

The anchoring and towing facilities consist of:

Initial anchor and wire to let the barge drift in to the beach.

Auxiliary anchors and wire to hold the barge to location.

A hauling arrangement to pull the boat off the beach.

The boom is arranged for hoisting around the harbor and some research will disclose the heaviest lift required. The "A" frame should be arranged with a top on it for a revolver crane which can be removed for outside work at sea. For lifting in the harbor the revolver crane has many advantages.

This will give a handy all purpose rig that can be used for several purposes and can even be used to hoist a boat out of the water provided a short boom lift of 150 tons can be arranged for.

Towing Lines

Galvanized steel towing hawsers are usually six strand, 37 wires to the strand. This is an extra flexible hawser and the wires are necessarily much finer than those used in the standard hoisting rope with 19 wires to the strand. It combines great strength with pliability and is used for towing heavily loaded barges at sea. It is made from a selected grade of high strength, tough steel, double galvanized to resist wear and corrosion.

Automatic winches are used in connection with these hawsers, maintaining a nearly uniform tension, giving and taking with the pitching and rolling of the barge or towing steamer in a seaway.

Take a 5½″ line, 1¾″ diameter, 485 pounds per 100 feet, has a breaking strength of 208,000 pounds, and a working load of 34,670 pounds.

Or a 6½″ line, 2″ diameter, weighing 630 pounds per 100 feet, has a breaking strength of 264,000 pounds and a working load of 44,000 pounds.

In the case of small vessels a galvanized steel towing hawser, 12 wires to the strand, 6 strands, and 7 hemp cores is used. It is much stronger than a manila hawser of equal size.

It weighs less than a manila hawser of corresponding strength and is not nearly so bulky and hard to handle. It is fully as pliable, much safer and more reliable. Automatic winches are used in connection with it, maintaining a nearly uniform tension. It is made of the best grade improved plow steel, double galvanized.

Take a 5½″ line, 1¾″ diameter, weighing 322 pounds per 100 feet, has a breaking strength of 136,600 pounds and a working load of 22,760 pounds.

Or a 6¼″ line, 2″ diameter, weighing 420 pounds per 100 feet, has a breaking strength of 176,400 pounds, and a working load of 29,400 pounds.

All wire rope should be lubricated to prevent rusting. It should not be coated with a compound too thick to penetrate the wire, leaving the inside wires without protection against water and moisture.

Towing lines are generally bolt rope stock which is either 3 or 4 strand extra fine quality manila fibre. The yarns in the rope are also spun finer although the size of the yarns or thread depends on the size of the rope. It is materially lighter than regular manila of all sizes and will range 10 to 15 per cent stronger. It is longer lived, easier to handle and good appearing, being whiter than commercial rope. Towing lines are medium soft lay, that is with slightly less twist than is generally put in standard ropes.

Take a 5½″ line, 1¾″ diameter, weighing 90 pounds per 100 feet, has a breaking strength of 28,750 pounds, and a working load of 4,790 pounds.

Or a 6″ line, 2″ diameter weighing 108 pounds per 100 feet, has a breaking strength of 34,500 pounds, and a working load of 5,750 pounds.

Nylon rope is about 1.87 times stronger than bolt rope and costs about seven times as much on a pound basis. It resists rot and marine decay, can be stored when wet and does not swell, kink, get hard or stiff.

Take a 5½″ line, 1¾″ diameter, weighing 91.66 pounds per 100 feet, has a breaking strength of 54,000 pounds, and a working load of 9,000 pounds.

Or a 6″ line 2″ diameter, weighing 115 pounds per 100 feet, has a breaking strength of 67,000 pounds, and a working load of 11,166 pounds.

News Flashes

JAPANESE SHIPBUILDING:

The recent suggestion on this page that ship construction in Japan would offer sales opportunities to the U. S. manufacturers brought inquiries that warrant a republishing of the list of ships. This will be done in the December issue.

* * * * *

RECONVERSION OF "GENERAL M. C. MEIGS"

American President Lines has proposed to the Maritime Commission that the P-2 liner "General M. C. Meigs" be taken out of the reserve fleet and reconverted for APL's trans-Pacific service with accommodations for 280 first class and 1200 third class passengers. She would replace the P-2 "General Gordon", former troop carrier, which has not been reconverted.

* * * * *

NEW SHIPS "GOOD NEIGHBOR" FLEET

President Albert V. Moore of Moore-McCormack announced in San Francisco that plans are being prepared for new 28-knot ships to replace the Argentina, Brazil and Uraguay if and when subsidy is granted for the route.

* * * * *

TRAILER SHIPS FOR ALASKA

Alaska Ship Lines, Inc., of Tacoma, has the motor ship Asa Lothrop, an N3 MA1 type vessel, for trailer ship service to Alaska, carrying refrigerated trailers. For the time being the service will be to Government and military outposts in connection with Alaska Freight Lines, Inc.

* * * * *

UNITED ENGINEERING CO. SOLD

A group consisting of Louis Dulien of Seattle and Ellis Jacobs, Mel Jacobs and Philip Sussman of San Francisco has purchased the United Engineering Company from Matson Navigation Company. Matson's ship servicing will be let out to all yards on open bid.

* * * * *

EXHIBIT SHIP

It is reported that Exhibition Ships, Inc., of New York, is planning to operate a liner, the former President Taft, on a year-long round the world tour, with stops in many countries for the development of export and import trade.

* * * * *

SUBSIDY INCREASE?

President Truman has instructed Maj. General Philip B. Fleming, Chairman of the Maritime Commission, to prepare an amendment to the Merchant Marine Act to increase the subsidy allowed American shipbuilders. General Fleming reported that currency devaluation brought the differential in favor of foreign yards to more than 60%.

THE RESERVE FLEET REPAIRS

It is expected that the program for repairs to 53 West Coast reserve fleet vessels will be authorized by Congress soon after it meets in January, with the work starting immediately after authorization.

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BIG ARMY DREDGE JOB

Bids have been called by Army Engineers at San Francisco for alterations and repairs on the hopper dredge "Donald A. Davison". Opening date, December 1.

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UNION OIL TANKERS

Announcement is expected any day on the plans of Union Oil Company's plans for a tanker replacement program.

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ARMY TRANSPORT CONVERSION

Of the Army Transport Corps' planned conversion of five C-4 transports on the Pacific Coast, one has been awarded to Pacific Ship Repair at San Francisco. Revised bids on two have been called for, and the other two will be announced early in the year.

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MARIPOSA AND MONTEREY

The Maritime Commission's proposal to Matson for the completion of the Mariposa is still being considered by Matson. Disposition of the Monterey will depend on the Mariposa deal.

* * * * *

P.F.E. AND P.T.L. APPLICATIONS

In addition to the subsidy application of Pacific Far East Line (calling for 6 new ships) reported last month, the Pacific Transport Lines has a subsidy application which calls for one additional vessel. Hearings on the two applications will be held in San Francisco, December 6.

* * * * *

159 CHARTERS

As of November 1, there were 159 vessels still under charter by the Maritime Commission, with the June 30, deadline for their termination drawing near. The Commission on October 14, notified all bare boat charterers the Commission would not ask for a renewal of chartering authority, and that privately owned fleets would be expected to replace the charters. Some charters on essential routes may justify an extension by Congress, but there will no doubt be some ships purchased and converted and some ships built. Operators must announce their plans by the end of this month.

* * * * *

DUTCH IMPORT AMERICAN DIESELS

The Netherlands Information Bureau reports that about $700,000 of Marshall Plan funds have gone to equip 20 Dutch coastal ships with American-made diesel engines, several of which have already been installed. The rehabilitation of this fleet is regarded as a highly important project in the Netherlands. Prior to the war the Dutch owned 482 coastal vessels, 82 per cent of which were owned by their own captains. At the outbreak of the war 200 of these escaped to allied ports, the remainder falling into German hands.

* * * * *

PITTSBURGH STEAMSHIP CO. MAY BUILD SHIPS

The Pittsburgh Steamship Co. of Pittsburgh, Pa. has plans for increasing its lake freighter fleet of 61 vessels and will have until December 1950 to commit its construction reserve funds. Ships planned are 620 feet long.

October Meeting Of San Francisco Society

Among the features of the October meeting of the San Francisco Port Engineers was a talk given by H. R. Cartwright of the New York Society who told of the problems which confront the Eastern organization. Stating that the New York Society eagerly followed the activities of the San Francisco Chapter through the medium of the pages of the *Pacific Marine Review*, a comparison between the two Societies was drawn. Organizational problems were ironed out at an earlier date by the San Francisco group, according to Cartwright, and the San Francisco Society was actually the first Port

AT THE OCTOBER MEETING OF SAN FRANCISCO SOCIETY

Top: Bob Streiff, Pacific Tankers, president of San Francisco Society, and Sam Nelson, Anchor Equipment Company, speaker for the October meeting.
Bottom: J. N. Faville, Wagner & Niehaus, Harry Martin, Port Engineer, Moore McCormack, and Dick Parkin, Westinghouse.

Engineer Society to function as a corporate body.

The compactness of the San Francisco group was stressed by Cartwright who stated that many of the New York Port Engineers spent as much as two-thirds of their time on the road, visiting and attending vessels at all Atlantic seaboard and gulf ports, while San Francisco Port Engineers travel to a much lesser degree and are on hand for meetings most of the year. A compliment was also paid to the San Francisco group on the quality of the appropriate programs, closely connected with the industry, which are presented to the membership.

Principal speaker of the evening, Samuel E. Nelson was presented by the Anchor Equipment Co. Speaking on the subject of bitumastic and bituminous coatings, Nelson pointed out that steel ships could not be constructed until such time as a proper protective coating

- - With The

to preserve the steel was developed. The shipping industry annually pays over six billion dollars to fight corrosion and rust. Corrosion is an electro-chemical process which may be hastened by the presence of an electrolyte. The electrolyte, in most cases, is water, and when that water is salt water, then the process is greatly accelerated. Even the air has a good deal of entrained water therein, and the presence of acid fumes in air make it sometimes even more active than water in hastening the chemical decomposition of the steel.

Any coating which will keep out the electrolyte will arrest corrosion. For the last hundred years, coal tar has been a satisfactory base for such a coating, and the most widely used of the coal tar products in this work is bitumastic. Normally, and for a great many years, bitumastic was applied hot, and served as a satisfactory coating for steel in temperatures ranging up to 140°. However, recent developments in the field have produced special bituminous coatings which may be applied cold, and coatings which will withstand temperatures up to 1200°.

SOCIETY NOTE:

The Marshal is back with the Society. Marshal T. J. Garlinger, who spent his accumulated vacation time visiting eastern manufacturers of engine room equipment, is back in the big place he occupies with the San Francisco society. He will be heard from regularly from now on with announcements of programs he has arranged.

Snapped at the October meeting of the Port Engineers Society of San Francisco are J. F. Parachini (left), newly appointed manager of Sales and Service for Radiomarine Corp. in San Francisco, and Harvey Butt, Pacific Sales Manager for Radiomarine.

Port Engineers - -

Ira B. Chapman

San Francisco Society To Elect Officers

The San Francisco Society of Port Engineers will vote at the January 4th meeting on officers for the 1950 term. A nominating committee has come up with the following slate:

For President: Ira B. Chapman of American President Lines. For Vice President: James A. Stasek of Pacific Far East Line. For Secretary-Treasurer: George Harlan of Fort Mason.

For Board of Governors (4 to be elected): W. H. Reich, Grace Line; E. P. Butler, Gamlen Chemical Co.; M. T. J. Garlinger, Fort Mason; Robert Streiff, Pacific Tankers; H. Lee Kincaid, Fort Mason.

Appointed to vacancies on the Board of Governors are: Charles Wright, Hillcone S. S. Co.; Joseph Gisler, Joseph Gisler Co.

Los Angeles Meeting

At the October meeting of the Port Engineers at Los Angeles, M. J. Gigy addressed the meeting on "Progress in Material Handling". This pertained to products of new design and manufacture, some newly developed, by Lake Shore Engineering Company of Iron Mountain, Mich., whom he and his associates represent as manufacturer's agents on the Pacific Coast.

The title of Gigy's talk was also the title of a sound and color film, and dealt with the Magie Winch and the Siporter Loader.

The talk on the Siporter was primarily a review of the *Cleveland* and *Wilson* units as well as the new unit of a little different style on the new American Export Lines' *LaGuardia,* recently finished. This phase of the talk was a review of the types and differences in the designs. The *Cleveland* and *Wilson* are of the extensible boom trolley type and the *LaGuardia*, the adjustable boom, fixed trolley, overhead retractable carriage type.

M. J. Gigy

The Magie-Winch

The Lake Shore Magie-Winch or Cargo Winch involves an application of an electro-magnetic eddy current clutch to a Lake Shore conventional geared, single or two speed, single or multiple drum winch.

The Magie-Winch control affords infinitely variable hoisting and lowering speeds between zero and maximum, and can also be arranged in the control circuit to provide a constant torque variable speed unit, thereby providing a constant tensioning feature. Also, both features, i.e., the controlled speed and constant torque feature, can be provided by the addition of a selector switch to provide both features in the one winch.

The method of operation is as follows: The driving motor is started by a push button starter and comes up to speed against zero load. With the control lever set in the central position, the friction brake solenoid is not energized and consequently, the brake is in the "set" position. Also, no excitation is applied to the field coil of either of the two eddy current couplings. Movement of the control lever towards the hoisting side of the quadrant, applies full excitation to the hoisting coupling but no movement of the drum or load takes place. This is due to the fact that the friction or magnetic brake has sufficient capacity to stall the coupling against the full motor torque. The torque limiting device in the electronic unit, actuated by the flow of current to the motor, automaticaly limits the coupling excitation to a value which prevents the motor becoming overloaded. This torque limiting device is adjustable and can be set so that the motor delivers any required percentage of its

Top: Siporter before installation in "La Guardia". On this model the boom travels with the trolley.

Bottom: Siporter installation on "President Cleveland" and "President Wilson". Boom stationary; trolleys carry the load. Trolley-load is approaching hatch from the far right.

New design Lakeshore Magie winch. This picture was taken during Akron Materials Handling Exposition.

maximum torque capacity. In addition to applying excitation to the hoisting coupling, the initial movement of the control lever closes the circuit through the solenoid of the friction brake but, through the medium of the time delay, the friction brake does not release until excitation is established on the eddy current couplings; thus insuring that full coupling torque is available before the brake releases. After this delay, the brake releases and the output shaft begins to rotate and the load to be hoisted commences to rise. The electric governor immediately takes hold and adjusts the coupling excitation to a value dependent on the position of the quadrant. That is to say, that if the control lever is in the position for "10 F.P.M." the speed setting potentiometer fitted to the spindle of the control lever establishes a bias in the grid circuit of the rectifier tubes, which in conjunction with bias, caused by rotation of the electric governor, so regulates the field current of the eddy current coupling, as to fix the output shaft speed at the required value to give a rope speed of 10 F.P.M.

Irrespective of the magnitude of the load, within rated

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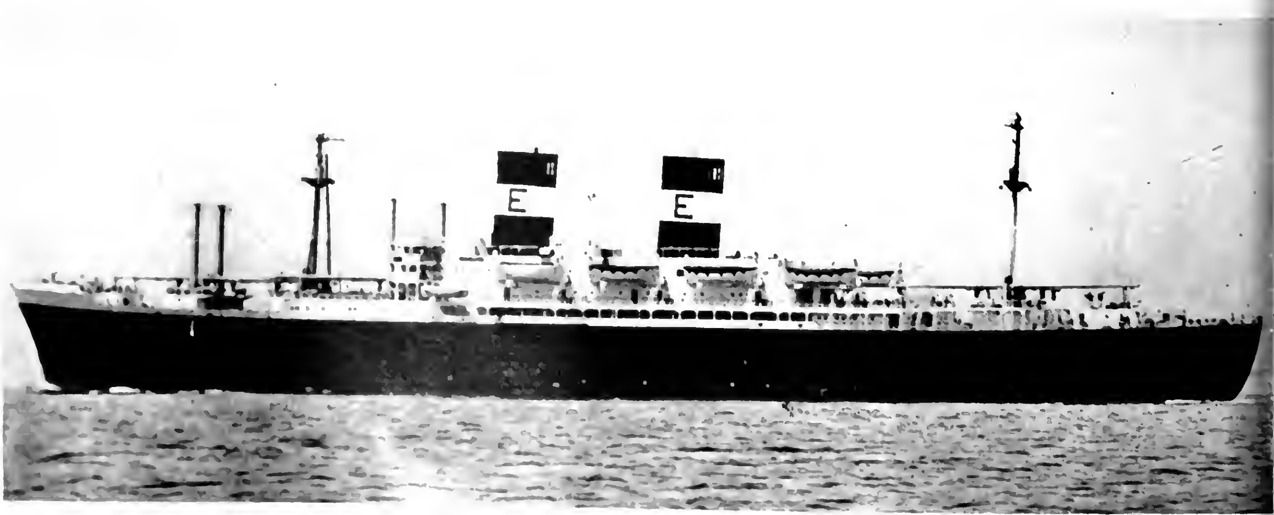
"La Guardia" with Siporter



Running Lights

Port of Oakland Day Luncheon

700 shipping people gathered in Transit Shed 3 at Port of Oakland Day luncheon October 27. At head table, President Claire V. Goodwin is speaking, and will introduce Senator William F. Knowland for a memorable address.

Part of the 450 who gathered to honor Comdr. Barbieri, with Chairman Ed Senter standing.

Commander Barbieri Honored

Comdr. Henry V. Barbieri was honored by 450 of his friends in the shipping industry at a testimonial dinner at the St. Francis Hotel on Monday evening, November 7. The Commander retired from the Coast Guard on October 31 after having been in the Marine Inspection Office at San Francisco continuously since 1916.

Comdr. Barbieri started his career with the Pacific

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At the speaker's table, below, are Dr. John Barbieri, son of the Commander; Capt. C. E. Guisness of the Coast Guard; Ed Flaherty of American President Lines; Ed Harms of Pope & Talbot; Bill Warren of American Bureau of Shipping; Bob Lillevand of Grace; Vic Bahorich of Pacific Far East Line; Lloyd Fleming of the Maritime Commission; Capt. Perkins of the Coast Guard; Commander Barbieri; Ed Senter of Grace; Les White of Coastwide Painters; Bob Wylie of Harbor Commission; Tom Ingersoll of Bethlehem; Bob Christie of Todd's; Jim Moore of Moore Dry Dock; Capt. R. O. Demarest of Sudden & Christensen; Al Safholm of Coastwise, and Capt. Frank McGurn, who succeeded Commander Barbieri in the Coast Guard.

Col. Palmer Succeeds Col. Hyde At Ft. Mason

Lt. Col. William Palmer has been named as Superintendent of the Water Division of the San Francisco Port of Embarkation.

He succeeds Lt. Col. S. F. Hyde, who has been transferred to Bremerhaven, Germany, after heading the Port's water, terminal and stevedoring operations for the last 30 months.

An Atlantic Coast shipping executive, Col. Palmer entered Army

Lt. Colonel William Palmer, Superintendent of Water Division at the San Francisco Port of Embarkation.

service in 1942 and was immediately assigned to the group of shipping men assembled under Col. Thomas Plant, San Francisco, to establish a transportation system in the Southwest Pacific, with Australia as their base of operations. As the Allied forces moved north into New Guinea, Col. Palmer went to Port Moresby and later to Finschhafen where he was engaged in port operations at the end of the war.

From Feb. 1946 to May 1949 he served as Superintendent of the Water Division at the Army Port of Bremerhaven. After returning home and completing his leave, he served as Deputy Superintendent of Water Division at San Francisco until taking over the superintendency on Col. Hyde's departure.

Col. Palmer began his shipping career in New York with the American Hawaiian Steamship Co. In 1931 he joined the Jarka Corporation in New York and remained with it until he entered Army service.

American Welding Society Elections

The American Welding Society has elected the following officers for the year 1949-50. President—O. B. J. Fraser, Assistant Manager, Development and Research Division, The International Nickel Co., Inc., New York; First Vice President—Harry W. Pierce, Assistant to the President, New York Shipbuilding Corp.; Second Vice President—Charles H. Jennings, Engineering Manager, Welding Dept., Westinghouse Electric Corp., Buffalo, N.Y.; District Vice President—John A. Grodrian, Director, Factory Laboratory, Bendix Aviation Corp., South Bend, Ind.; Vice President of the Western District—W. F. Boyle, Vice President and General Manager, The Pelton Water Wheel Co., San Francisco.

Fraser joined The International Nickel Company in July 1917 as metallurgical engineer at the Bayonne, N. J. Works. During 1922, while still with the company he became associated with the Mellon Institute in the study of corrosion of nickel and nickel alloys. He is actively identified as both officer and member of committees of a number of metallurgical and engineering organizations and is the author of several technical publications.

Pierce is a graduate of the Naval Academy and post-graduate in

O. B. J. Fraser

Naval Construction of the Massachusetts Institute of Technology. Since joining the New York Shipbuilding Corp. in 1930 most of his work has dealt with welding in ship construction. He has served on many advisory committees investigating welded stresses in ships, steel for ship construction and corollary investigations.

Jennings received his B.S. in Mech. Engr. from Iowa State College in 1928, and became associated with the Westinghouse Electric Corporation. He instituted advanced studies in the mechanical properties of welds, welding design, applications and problems, and in 1936 he was placed in charge of all welding research. He is the author of more than thirty articles on welding and two books.

Grodrian graduated from Purdue University in 1934 with the degree of B.S. in Chemical Engineering, and joined the General Electric Company at Fort Wayne in 1934. He worked for the Carnegie-Illinois Steel Corporation's Metallurgical Laboratory 1936-39 and in that company's Chicago office as a Technical Trade Consultant from 1939 to 1942. Since 1942 he has been with the Bendix Aviation Corp.

Boyle is a graduate of Pratt Institute, Brooklyn. From the time of his graduation in 1927 until 1945 he was with the Westinghouse Electric Corporation. During the war he was Manager of that Com-

pany's Gas Turbine Activities, coordinating all efforts in the development of the Navy jet airplane power plant. He joined The Baldwin Locomotive Works, Eddystone, Pa., in 1945 as Assistant to the Vice-President and later that year was named General Manager of The Pelton Water Wheel Co., a subsidiary of The Baldwin Locomotive Works, which, in turn, is owned by Westinghouse. Boyle was appointed to his present position in 1946.

Adm. Merlin O'Neill to be Commandant of Coast Guard

Rear Admiral Merlin O'Neill has been nominated by the President to be Commandant of the U. S. Coast Guard with the rank of Vice Admiral to succeed Admiral Joseph F. Farley, who retires December 31, 1949.

Admiral O'Neill has served as Assistant Commandant of the Coast Guard at Coast Guard Headquarters, Washington, D.C., since February 15, 1946.

Admiral O'Neill took preparatory work for Coast Guard Academy entrance examinations at Marion

Rear Adm. Merlin O'Neill
Official U. S. Coast Guard photo.

Institute, Marion, Ala., and was appointed a cadet in the Coast Guard in July, 1918. Commissioned an ensign in March, 1921, his first assignments were on the cutter *Gresham*, the *Haida*, the *Algonquin*, and the cutter *Mojave*. He served aboard the destroyer *Erricsson* and became commanding officer of that vessel in 1927.

He was attached to the staff of the Coast Guard Academy, New London, Conn., for three years from 1927 to 1929 and was designated as commandant of cadets in addition to his regular instruction duties.

Leaving the Academy in 1930, O'Neill served successively as commanding officer of the destroyers *Monaghan, Herndon* and *Cassin*, and the cutter *Apache*. In October 1935 he was transferred to duty at Coast Guard Headquarters where his first assignment concerned off-shore patrol activities in Office of Operations. When the Coast Guard Auxiliary was formed, he served as its first Chief Director.

Detached from Headquarters in October 1942, he became commanding officer of the assault transport U.S.S. *Leonard Wood* and received the Legion of Merit for outstanding services as commanding officer of this transport during the amphibious invasion of Sicily. The *Leonard Wood* recently was awarded the

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New California Paint Factory for Pittsburgh Plate Glass

Pittsburgh Plate Glass Company expects shortly to sign contracts for the construction of a paint plant at Torrance, California. An ultra-modern plant, the Torrance facility will cost approximately $1,250,000, according to E. D. Griffin, vice president in charge of Pittsburgh's paint division. The plant should be ready to go into production within twelve months. Preliminary building design was by Pittsburgh paint division design specialists.

Located about 15 miles from downtown Los Angeles, the plant will be erected on a triangular, 15 acre site, fronting on Crenshaw Boulevard. Original equipment will permit production of 1,500,000 gallons annually. Sufficient floor area for additional equipment is available to boost the production to 2,600,000 gallons in the future.

The company operates 41 paint sales stores on the west coast.

Mainly a one-story, earthquake resistant structure, the building will have a second-floor center section designed for loading ball and pebble mills. Mixing of pigments for roller mills and screening of the raw materials into filling hoppers will be accomplished on the second floor.

The factory building will be of reinforced concrete with broad, continuous windows for improved day-lighting conditions and the office building will be of brick construction.

All areas in which paint is thinned, tinted or processed will have northern light and all storage space will have southern exposure. Positioning of processing areas to the north will take advantage of the constant, visual qualities in the neutral, north light and will minimize entrance of solar heat into the manufacturing areas.

In area, the plant will have 157,000 square feet of floor space, loading docks and covered walkways.

E. D. Griffin
Vice president and general manager, The Paint Division, Pittsburgh Plate Glass Company.

An additional 93,000 square feet of roadways and parking lot area will be available.

A full line of Pittsburgh house, industrial and automobile paints will be produced at the Torrance plant. Model laboratory facilities will be installed and product development and control programs accelerated.

A lacquer producing plant will be moved intact from the firm's plant in Los Angeles. Planned also is the installation of a gas fired resin manufacturing unit. Sufficient resin production is anticipated to supply both the Torrance and the Portland, Ore. paint plants operated by the firm.

Employees of the Los Angeles

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Architect's conception of Pittsburgh Plate Glass Company's ultra-modern paint producing plant at Torrance, Calif. Pittsburgh Plate, one of the nation's major paint producers, expects to have the $1,250,000 plant in production within a year.

du Plessis with Price Company

M. P. (Duke) du Plessis was recently appointed as Manager of the Pacific Coast Marine Division of Price Building Specialties Company. He was formerly Manager of the West Coast Marine Division for the Martin-Parry Corporation of Toledo, Ohio, and has broad acquaintance with West Coast shipyards, and training and experience in the design and execution of marine interiors. His service is available in the preparation of bids on ship interiors and superstructures.

The Price Building Specialties Company, 35 Gilbert St., San Francisco, of which L. N. Price, Sr., is president, is in its 59th year, and boasts the most modern forming and finishing equipment for the manufacture of fire doors, sliding doors, door frames, wardrobe fronts, wire mesh partitions, safety treads, Marinite bulkhead framing and trim, and miscellaneous metal joiner work.

M. P. du Plessis

Superheater Co., Ltd. in Canada to Represent De Laval

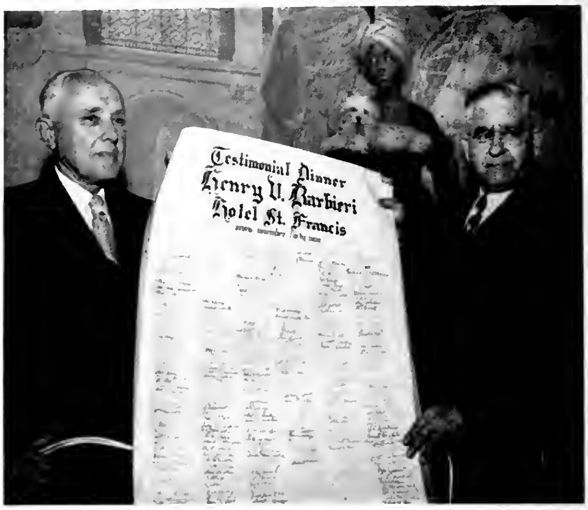
The Superheater Co., Ltd. of Montreal, Canada (in conjunction with its affiliate, Combustion Engineering Corp., Ltd.) has been appointed to represent the De Laval Steam Turbine Co. of Trenton, New Jersey.

The Superheater Co., Ltd. will sell and service De Laval turbines, pumps, gears and compressors in the Provinces of Newfoundland, New Brunswick, Nova Scotia, Prince Edward and Quebec.

Comdr. Barbieri Honored

(Continued from page 82)

Mail Steamship Company on March 17, 1901, making the run to Panama on the SS *San Blas.* This was followed by duty with the Army Transport Service on the *Mead, Logan* and *Sherman,* bringing troops home from the Philippine Islands after the Spanish American war. Another tour of duty with the Pacific Mail Company found him on the famous old coal burners *Korea, Siberia*



In addition to the scroll shown in the picture, the Commander was presented with a television set. Shown with Barbieri (left), is Chairman Ed Senter.

and *China.* As Chief Engineer of the *Siberia,* his vessel broke the world's record of that time for the run from Japan to San Francisco. In 1916, while supervisor of the building of the Army dredge *San Pablo,* which is now well known here in the Bay Area, Comdr. Barbieri passed the Civil Service Examination and became an assistant boiler inspector, thus ending fifteen years of sea duty.

In his thirty-three years of inspection duty under the Steamboat Inspection Service Bureau of Marine Inspection, and as Officer-in-charge, Marine Inspection Office, under the U. S. Coast Guard, the Commander has made innumerable friends in the maritime industry while carrying out his official duties. Of these, a committee of the following men was selected to make the arrangements for the dinner: Victor Bahorich, Pacific Far East Lines; Leslie White, Coastwise Painters; Ed Senter, Grace Line; William B. Warren, American Bureau of Shipping; Al Safholm, Coastwise Lines; H. P. Stewart and William Quale, Bethlehem Steel Corporation; and Robert Christie of Todd's Pacific Coast Shipyard.

Presiding at the dinner was Ed Senter, who had sailed with Barbieri 40-odd years ago. Between serenades, complimentary remarks were made by Vic Bahorich, Bill Warren, Tom Ingersoll, Bob Wylie, Jim Moore, Ed Harms, Ed Flaherty, Al Safholm, Capt. Henry Perkins, Lloyd Fleming, Capt. Demarest and Heinie Gelhaus.

Advertising is a continuous function since the public is constantly changing as evidenced by the 6,485 people who reach the age of 21 each day in the United States.

Maritime Commission Reorganization

A reorganization announcement affecting several bureaus and divisions of the United States Maritime Commission, involving a number of important reassignments of personnel, has been issued at the direction of Major General Philip B. Fleming, Chairman of the Commission, by Charles D. Marshall, General Manager.

The changes, effective are as follows:

The Bureau of Management is abolished and its Chief, Ward B. Freeman, is assigned to the position of Operations Examiner in the Bureau of Government Aids. Two of the divisions of the Bureau of Management report now to the General Manager's Office. They are the Division of Personnel, whose Chief, Clyde L. Miller, becomes Director of Personnel; and the Division of the Budget, whose Chief, H. M. Hochfeld, becomes Budget Officer. The Division of Office Services, George A. Viehmann, Chief, is transferred to a newly established Bureau of General Services. The Planning Office, headed by Edison Montgomery, becomes part of the General Manager's Office.

The Bureau of Marine Operations, headed by Frank E. Hickey, Chief, is abolished. There is established a Bureau of Vessel Custody, the Chief of which is Ernest W. Gorman, formerly Chief of the Division of Reserve Fleet of the Bureau of Marine Operations. Under the Bureau of Vessel Custody will be a Division of Vessel Operations, M. I. Goodman, Chief; a Division of Vessel Preservation, Henry Samara, Chief; and a Division of Fleet Operations, Maurice F. Dineen, Chief.

A Bureau of General Services is also established, headed by Harold E. Steffes, chief of the Division of Supply of the Bureau of Marine Operations. The Bureau of General Services includes a Division of Purchase and Sales, Frank E. Hickey, Chief; a Division of Property Management, Howard J. Marsden, Chief; and the Division of Office Services headed by Mr. Viehmann.

A Letter From France

MINISTÈRE
DE LA
MARINE MARCHANDE

Paris, le 13 Septembre 1949
3, Place de Fontenoy - PARIS-VII°
Téléphone : SUFFren 40.90

TODD SHIPYARDS CORP.

1 Broadway

NEW YORK 4

Messieurs,

Nous sommes très intéressés par le "NORTH STAR" dont il est fait mention dans le "Pacific Marine Review".

Pourriez vous nous en envoyer des photographies originales susceptibles d'être reproduites dans "Les Annales Techniques de la Marine Marchande" (Silhouette, vues extérieures de pente, apparaux de manutention etc...) et les principales caractéristiques?

D'avance nous vous remercions et vous prions d'agréer, Messieurs, l'assurance de notre considération distinguée.

ANNALES TECHNIQUES
DE LA MARINE MARCHANDE
La Rédaction

Lecorno

Gentlemen: We are very much interested in the North Star mentioned in the "Pacific Marine Review" Could you please send us pictures, of a type which can be used in our publication "The Annals of the Merchant Marine" (Profile, outside view of decks, upkeeping equipment, etc. Thank you.

Adresser la réponse à:
Madame LECORNO - Bureau Economique
Ministère de la Marine Marchande
3 Place de Fontenoy
PARIS 7è

Pittsburgh Plate Glass

(Continued from page 86)

paint plant, operated by Pittsburgh Plate Glass Company since 1925, will be transferred to the Torrance operation when the new unit is ready for production. Louis F. Theurer, divisional director, will be in charge of the operation.

Pittsburgh Plate Glass Company, one of the nation's major paint producers, also operates paint producing plants at Detroit; Dayton, Ohio; Milwaukee; Newark, N. J.; Pittsburgh and Springdale, Pa.; and Portland, Ore.

Roebling's New Booklets

John A. Roebling's Sons Company, Trenton, N. J., announce three informational booklets on their products. They are entitled "Roebling Marine Products" (A-907), "Roebling Yacht Rigging" (A-904) and "Handle Your Loads Faster". The booklet on Roebling marine products covers constructions of wire rope, wire rope cores, electrical wire and cable, fittings, galvanized wire rope, grades of wire rope, preformed wire rope and slings. It is replete with charts and illustrations. For the yachtsman, Booklet A-904 offers invaluable rigging information, and Roebling will also furnish recommendations for special rigging installations or those which present unusual problems. "Handle Your Loads Faster" gives information on Roebling's non-kinking, non-spiralling flexible slings, complete with charts.

New Drums For Rope

Paulsen-Webber Cordage Corporation, announces the results of a six months testing period for a new type of reel for rope and strand.

The reels have warp-proof plywood heads and one-piece hardwood drums, held together by tightly drawn steel bands. Designed for a special group of wire ropes and strand, the reels tested matched the performance of bolted wood reels under loads up to 120 pounds during the testing period. Advantages include lower cost and a lighter, smoother reel. These qualities make them easy to handle and display and their smoothness makes it possible to use silk screen printing on their heads.

Rust-Sele Represented by The Darcoid Company of California

The Darcoid Company of California, now in their fifth year in San Francisco, have been appointed Northern California Distributors for the Rust-Sele line of Rust-Preventive Paint Products, manufactured by the Passonno-Hutcheon Company of Cleveland, Ohio.

Rust-Sele is an outstanding rust-inhibitive paint, made with a vehicle of scientifically refined and deodorized Fish Oil — reinforced with Tung Oil.

Rust-Sele comes in colors and aluminum, covers completely and spreads enormously at a cost of less than 1c per square foot of surface.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946.

Of PACIFIC MARINE REVIEW, published monthly at San Francisco, California, for September 28, 1949, State of California, County of San Francisco.

Before me, a Notary in and for the State and county aforesaid, personally appeared B. N. DeROCHIE, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the PACIFIC MARINE REVIEW, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Acts of March 3, 1933 and July 2, 1946, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:
Publisher, JAMES S. HINES, 580 Market St., San Francisco 4.
Editor, T. DOUGLAS MacMULLEN, 580 Market St., San Francisco 4.
Business Manager, B. N. DeROCHIE, 580 Market St., San Francisco 4.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)
JAMES S. HINES, 580 Market St., San Francisco 4.
MARY G. HINES, 580 Market St., San Francisco 4

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)
None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

B. N. DeROCHIE (Signed)
Business Manager.

Sworn to and subscribed before me this 28th day of September, 1949.

EDITH GOEWEY
(SEAL) Notary Public in and for the City and County of San Francisco, State of California.
(My commission expires December 24, 1952)

McLaren and Pennington Back From Survey Trip

Oh, Boy! Here comes some tonnage! Mait. Pennington, Vice President, and Richard McLaren, President of Pacific Transport Lines, standing in main lobby of their "Pacific Transport".

McLaren and Pennington are sparking the campaign for the routing of cargo through Pacific Coast ports to the Orient.

Albert V. Moore on West Coast Tour

On a visit to West Coast offices of Moore McCormack Company, accompanied by Pacific Coast Manager, K. C. Tripp, President Albert V. Moore announced the adding of a cargo vessel to the Pacific Coast to South America route. He disclosed plans for building new 28 knot passenger-cargo liners to replace the *Argentina, Brazil* and *Uruguay*.

Right:
Albert V. Moore.

Left:
Albert Moore and Mrs. Moore on the balcony of the Fairmont Hotel, San Francisco.

PFEL New De Luxe Passenger Service

Pacific Far East Line inaugurated its new deluxe passenger service November 8. The service will be on a monthly basis and will take passengers to Havana, Marseille, Genoa, Venice, Trieste, Piraeus, Haifa, Tel Aviv and Tunis.

Cargo lines accommodate 12 passengers with single fares starting at $450 one way.

The company started its cargo service early this year but will not take passengers until the current sailing.

Todd's

(Continued from page 43)

Governor's Island and Buttermilk Channel. Ten piers total more than 7400 linear feet. The plant has more than 40 principal shops, utility and office buildings in use with a floor area of more than 510,000 square feet, and approximately two miles of tracks for transportation and the handling of heavy materials by cranes and locomotives. Mobile Service is also available.

Todd At Hoboken

The Hoboken Division has 10 dry docks and 10 piers and can service as many as 50 ships simultaneously. The dry docks alone can accommodate approximately 60,000 tons of shipping at one time. The largest dock can lift 20,000 tons, is in six sections, is 657 feet 3 inches in overall length and 100 feet inside width. The smallest can accommodate vessels up to 726 tons and is particularly useful for handling harbor craft. The 10 piers total more than 6500 linear feet. The Hoboken yard is located at Park Avenue and Seventeenth Street, Hoboken, on the Hudson River, less than four miles from the river's mouth and opposite New York's Thirty-fourth Street. The site is less than 15 minutes by public transportation from Times Square. A railroad siding into the plant provides convenient receipt and handling of materials. The mobile service of this plant serves the entire harbor.

Todd At Barranquilla

Todd manages the shipyard owned by Union Industrial Y Astilleros "Unial", Barranquilla, Colombia, South America, located at the mouth of the Magdalena River. Todd has made extensive improvements to this plant, which is equipped for the construction and repair of river tow boats and barges for oil, general cargo or other specialized service. It is also prepared to do almost any type of machine and steel fabrication work of a marine, industrial, oil field, or civil nature.

The outside facilities include a side-haul marine railway for handling barges and river craft up to 200 feet long, and a number of pieces of mobile weight-lifting equipment, both land and floating.

Marine work on sea-going vessels of deep draft can be handled by "mobile service" while ships are anchored near the plant, berthed at the Barranquilla Municipal Docks or anchored in the roadstead.

Todd At Elmhurst

The Combustion Equipment Division located at Elmhurst, Queens, New York, is a manufacturing center which markets a number of lines for the marine industry and commercial and industrial companies. The division designs, develops and manufactures gas and fluid fuel-burning equipment to serve all classes of boilers in vessels from yachts to dreadnaughts, and for use in power plants and buildings of all sizes excepting private homes.

Two of the division's rapidly expanding products are TIFA (Todd Insecticidal Fog Applicator) and THAG (Todd Heated Air Generator). TIFA is a scientifically proven applicator of newly developed and old type chemicals of selected particle size in a true, clean fog, created by the heating and fractionating of liquefied insecticidal chemicals into sub-microscopic particles, and is used throughout the world in the battle against insects in homes, industrial structures and in open spaces. THAG may be used to dehumidity products or plants located near water, for super-heating steam, defrosting ice-covered machinery or installations, defogging enclosed glassbound areas and for annealing, enameling, hardening, baking and porcelainizing.

Adm. O'Neill

(Continued from page 85)

Navy Unit Commendation for operations from 1942 to 1945.

Returning to shore duty in 1944, he served for a short period in the District Coast Guard Office, Fifth Naval District, Norfolk, Va., and in July was designated commanding officer of the Coast Guard amphibious training unit at Camp Lejeune, New River, N. C. In August he was assigned as commander of the Baltimore Section, 5th District, a command embracing the activities of Captain of the Port, Division of Marine Inspection, Pilot Stations, the Coast Guard Base, Sub-Recruiting Station, and Fort McHenry Training Station.

Early in 1945, he returned to Headquarters for assignment as Assistant Chief, Finance and Supply Officer until August of that year, when he was promoted to Commodore and transferred to Norfolk as District Coast Guard Officer, Fifth Naval District. In February, 1946 he was nominated by the President for appointment as Assistant Commandant of the Coast Guard with rank of Rear Admiral.

Fairbanks-Morse Appoints Harvey Heil L. A. Diesel Manager

Harvey C. Heil has been named manager of the Diesel Engine Department of Fairbanks, Morse & Co., 4535 South Soto Street, Los Angeles. He replaces Russ Stevens who has taken up a new assignment with the company in the East.

For more than twenty years, Harvey Heil has been connected with Fairbanks-Morse at St. Louis, Mo., and Boston, Mass., and he brings to the Los Angeles organization a varied experience which has brought him in contact with practically every known application of Diesel power.

Cushing Gives Newcomen Lecture at New London

The Eighth Annual Newcomen Lecture was given October 4, at the Coast Guard Academy, New London, Conn. The speaker was John E. Cushing, president of the Matson Navigation Company, and graduate and trustee of Stanford University.

Larry Rapp is Back

Larry Rapp, well-known along the San Francisco and West Coast waterfronts has returned to C. C. Moore & Co. Engineers after an absence of seven months.

He will, as before, be an assistant to W. B. Hill, Manager of Marine Sales and Service, but will have expanded responsibilities in the stationary work of the firm.

New Bailey Combustibles Recorder Bulletin

Design improvements and new applications for the Bailey Combustibles Recorder are featured in a new 16 page bulletin now being distributed by Bailey Meter Co., Cleveland.

Drawings and photographs explain the operation of this electronic type instrument which operates on the catalytic combustion principle. Typical applications to Boiler Furnaces, Atmosphere Producers, Rotary Kilns, Industrial Furnaces, and Chemical processes are illustrated.

Either air or electrically-operated control of combustibles content may be had with the combustibles recorder. Both are shown and explained. Also described, is the recorder's highly accurate a-c measuring circuit.

Bulletin 150-A, "Bailey Combustibles Recorder" may be had on request.

Port Engineers Los Angeles Meeting

(Continued from page 80)

capacity, and irrespective of what position the control lever may be moved to, the load will accelerate to the corresponding speed in the minimum possible time period, and will remain at that speed until the control lever is moved to some other setting or speed value.

If it is desired to hold the load suspended in mid-air, the control lever is moved back to the central zero position, at which point the friction brake is applied or "set" and excitation is cut-off the coupling. Under these conditions the motor runs idly or, if desired, may be switched off. When it is desired to hoist the load again, the control lever is moved to the hoisting side of the quadrant and again excitation is applied to the hoisting eddy current coupling. If it is desired to lower the load, the control lever is moved towards the lowering side of the quadrant. This has the effect of applying excitation to the hoisting eddy current coupling and, also, as in the case of hoisting, releases the brake. However, in addition, for the lowering condition, connections are made in the electronic circuit which results in the load being braked by the hoisting coupling which is running in the opposite direction to the lowering coupling. The value of excitation applied is dependent upon the control lever setting, and is controlled by the electric governor also.

In the event that the crane hook is so lightly loaded that it will not descend by gravity, the control lever may be moved over to the maximum range, thus driving down the hook under power.

As for application of the Magie-Winch, it is to be noted that the minimum of control equipment is required, and the complete electronic control may be placed in a cabinet at the winch or in a deck house, and has dimensions approximating a maximum of the present brake enclosure.

American Export Lines Elects Officers

John E. Slater of Essex Fells, N. J., Executive Vice President of American Export Lines, has been elected President of the company to succeed William H. Coverdale who died August 10.

Joseph A. Thomas of New York, was elected Chairman of the Board, a position likewise held by Coverdale.

John F. Gehan, Vice President of American Export Lines, and Miles Coverdale Kennedy, partner of Coverdale & Colpitts, consulting engineers, and a nephew of the late Mr. Coverdale, were elected to board membership.

Slater joined American Export Lines in 1934 as a Director, and a year later he became Executive Vice President. He is a partner of Coverdale & Colpitts, Chairman and a Director of the American Steamship Owners Mutual Protection & Indemnity Association, and an organizer in 1937 and former Executive Vice President of American Export Airlines, a subsidiary of the steamship company.

Gehan joined the steamship company in 1925, spent many years abroad as European Director, and was elected Vice President in 1939. He is a past National President of the Propeller Club of the United States, serving two terms, 1944-1946.

Marine Insurance Subrogee

(Continued from page 49)

right of action. The only difficulty encountered by such a rule, although the Court refused to recognize it, was that the agent, if you can call New Hampshire Fire Insurance Company such, was acting for an owner who was not absent.

The Court overruled the exceptions of the shipowner with a qualification that the insurer as libelant could not obtain a decree in its favor until it appeared in the evidence that it had in fact paid the loss, or that it was acting as an authorized agent of the cargo owner in filing the suit, or that the latter had subsequently ratified that action.

Passenger Ticket —Limit of Liability

Leonard and Kathleen Cohn filed libels in admiralty against the United States Lines Company on the ground that they were owners of the steamship *American Farmer,* and therefore responsible for loss of the Cohns' baggage and personal effects allegedly due to the negligence of the steamship company's employees. The Company responded to the libels by way of answer, asserting among other things that the contracts as expressed in the tickets provided that unless a higher value be recorded, the valuation of passengers' baggage shall be taken to be not more than $75, and that these valuations should be taken as a limit of liability of the shipowner for loss or damage; and further, that another clause of the ticket stated that the shipowner would not be liable for loss or damage to money, jewelry, precious stones, securities, and other valuables which had not previously been deposited with the purser and placed in the safe in the purser's office, and that unless a higher value be recorded, the value would be taken to be not more than $100.

In order to determine whether these clauses in the tickets effectively limited liability, the cases were submitted to the Court upon agreed stipulations of fact which showed that Mr. and Mrs. Cohn purchased their tickets from the respondent company in New York, and travelled pursuant to the tickets; that the vessel collided with another, and as a result Mr. and Mrs. Cohn each claimed loss to baggage in excess of $75, and to jewelry in excess of $100. The stipulations further show that Mr. and Mrs. Cohn failed to record a higher value than $75.

On the face of the tickets on the left side appears the legend, "Eastbound Contract Ticket" followed by the name of the ship, the names of the passengers, the amount of the fare, etc. On the right side of the page the following language appears:

> "It is mutually agreed between the shipowner, and the passenger named herein, that in consideration of the payment to the shipowner of the passage money by or on behalf of the passenger, the shipowner will provide the said passenger with passage as stated in the margin, unless prevented by some unforeseen circumstance, on the terms stated herein * * *.
>
> "The terms hereinbefore mentioned form part of the contract ticket and are as follows:"

Then follow certain terms not material to the issue at bar. At the bottom of the face of the ticket in bold face type appears the legend, "Terms continued on the

other side of this ticket." On the reverse side the clauses limiting liability appear. On the face of the ticket the following note also appears:

"The Shipowner's liability is strictly limited, but passengers can effect insurance on their baggage at any of the Shipowner's Offices or Agencies."

It was argued against the efficacy of the clauses limiting liability that they were not bound by them because their attention was not specifically directed to the clauses; and secondly, that they are against public policy.

An examination of federal cases reveals that an arbitrary limitation unaccompanied by any right to increase the amount of proportional payment is void as against public policy, and where the limitations are mere notices and not part of the contract, they do not bind the passenger if not called to his attention. However, when the limitation of liability clause is included in the terms of the contract itself, it has been held that the passenger is bound whether or not he was aware of the limitation.

The Court held upon the basis of the authorities stated that the limitation of liability clauses were actually embodied within the contracts themselves, and therefore, they are effective to limit the liability of the shipowner. Inasmuch as all passengers have the right to increase their coverage on their property by insurance, as pointed out on the face of the ticket, there is no violation of the public policy requirement.

Fyr-Fyter Company Announces M. J. Gigy Appointment

A. G. Kriowall, Division Sales Manager of The Fyr-Fyter Company of Dayton, Ohio, announces the appointment of M. J. Gigy & Associates, 112 Market Street, San Francisco 11, as distributor to the marine, chemical, petroleum and industrial trade of their complete line of hand portable fire extinguishing equipment.

The Fyr-Fyter Company have been engaged in the exclusive manufacture of quality fire fighting equipment of a wide range of types and sizes for more than thirty-one years, including small vaporizing liquid hand, large central station, soda acid, foam, large 20 and 40 gallon, engine, indoor and outdoor types in soda acid, chemical, foam and the revolutionary new instant "Karbaloy" loaded stream types, together with carbon dioxide type units in all sizes, as well as a complete line of refills and recharges.

Adequate stocks will be maintained to cover all normal requirements from San Francisco with immediate shipment from the factory at Dayton, Ohio on very large quantities.

GE Sales Manager Tours West Coast

L. W. Goosetree, Syracuse, New York, National Sales Manager, Marine Equipment, of General Electric Company's Electronics Department, recently made a tour of the West Coast to study market conditions and to confer with company personnel. His tour started on Oct. 3 at Seattle and ended October 12 in Los Angeles, when he returned East. He conferred in San Francisco with W. M. Boland, San Francisco manager for the company's Western Division, Electronics Department.

Current World Trade Data

(Continued from page 70)

50% export rate) no longer applies to lire-dollar transactions. All dollar transactions will be subject now to the export rate which is quoted daily.

Israel

The Export Import Bank authorized a credit of $2,350,000 for the purchase of materials and equipment for the improvement and expansion of Israel's ports. The total of credits authorized under the $100,000,000 loan of last January is now $53,350,000, leaving an unused balance of $46,650,000.

India

According to the Office of International Trade, the Government of India has announced a new import control policy for the remainder of the year which will place severe restrictions upon imports from the United States. In an effort to balance its foreign exchange budget, the Government of India will make a drastic slash in imports from both hard and soft currency areas. The basis for granting import licenses will be the essentiality of the particular goods involved, and monetary ceilings. No licenses will be granted for goods when similar goods or substitutes are available from local sources. Luxuries and non-essentials may not be imported from any country.

Importers desiring to buy goods from a hard currency area will be required to present evidence that similar goods or substitutes are not available from soft currency countries. Dollar imports will be confined to essential raw materials and machinery, and techn[illegible]tional books. Motor trucks may be imported from the United States and Canada, but no passenger automobiles. Motor car imports from other countries will be extremely limited in quantity, and only those in a crated, knocked-down condition will be permitted.

Among the items previously imported from the United States but now forbidden are diesel engines, industrial sewing machines, machinery belting, motors and generators (including parts), passenger elevators, gasoline and kerosene engines (except parts for road vehicle engines), certain precision and measuring tools, and tobacco.

Not affected by the new announcement are goods falling under the capital goods and heavy electrical plant licensing schemes previously announced.

Mexico

The Mexican Government has raised the official valuations of almost all import items by approximately 25%, effective August 1. This action has been taken to adjust the valuation to the current official rate of exchange. The measure follows a decree published in the Diario Oficial of July 4, by which the Mexican Government reduced the export surtax of 15% advalorem for many export commodities.

Nicaragua

Import category lists for granting foreign exchange have been drawn up by the Nicaraguan Exchange Control Commission, in accordance with provisions of the new Exchange Control Law. The categories are classified as Preferential, First (essential), Second (semi-essential), and Third (non-essential) Category. Cordoba deposits against approved import permits are required as follows, based on the c.i.f. value of the goods plus

customs duty and surcharges: First category, 25%; second, 50%; and third, 100%. Due to their length, the lists will not be published, but information regarding the placement of specific items will be given upon inquiry by the American Republics Branch, Office of International Trade, Washington, D. C., or San Francisco.

Russia

An export license was issued by the Department of Commerce on August 23, 1949, for the shipment to Russia of 40 electric blast hole drillers and accessories totaling $502,677.88.

Fitler Holds Open House

The Edwin H. Fitler Company celebrated their 145th year of rope manufacture on October 20 by being host to employees' families, retired employees, and friends. The occasion took place at the main factory in Frankford, Philadelphia, Pa.

Over 300 guests were escorted through all phases of plant operation. and studied displays of manila and sisal products including the largest of towing hawsers and the newest of pure white nylon yacht rope.

"It has been estimated that over 200,000 useful products trace their family tree back to volatile substances accumulated during millions of years in the formation of bituminous coal—nylon, moth balls, cleaning fluids, benzol, toluol, ammonia, aspirin, insecticides, shoe polish, synthetic flavors, dyes, plastics, and wood preservatives."—Steel in the War.

Singing Propellers

(Continued from page 45)

sent quite a latitude, although the corresponding slip angles at the blade tips of the Liberty propellers would only be 1½ to 3 degrees respectively. To quote Admiral Taylor, "These are small angles and the fact that slip angles are so small should never be lost sight of in considering operation of propellers."

Without question, racing propellers must subject the shafting to heavy vibration stresses, and it appears to be quite usual not to say unavoidable, on some of the return voyages of dry cargo ships. Tankers, however, need not be included in this category.

In conclusion we suggest that the underlying cause of shaft failures could be and probably is in the operation of the propeller at a slip ratio lower than that corresponding to maximum efficiency. The problem in the Liberty type ships we believe to be similar to that of the *Clairton* although, in the reports of her performance, there was no mention made of a noisy or singing propeller. In her case the propeller was in mass balance with ogival sections.

With propellers operating under such conditions as those described, in which vibration is always present, some of these small stress raisers mentioned by the Bureau could be of great importance. Similarly the stresses due to racing of the propeller in heavy water might be just enough to complete the damage already done to the shaft by vibration resulting from continuous operation at low slip; it may be the straw that broke the camel's back.

Keep Posted

. . . The Life Blood of Industry Is Invention . . .

New Chemical Pump

A special diaphragm, that stands up unusually well to most fluids, is the outstanding feature in the new No. 777 chemical pump. It is now available for immediate shipment from the General Scientific Equipment Co., Philadelphia.

It is especially made for lacquer thinner, synthetic thinner, turpentine, acetone, benzene, benzol, perchlorethylene, trichlorethylene, detergent oils, linseed oils, stoddards solvent and many others too numerous to mention.

The special diaphragm is made of heavy cross weave cord, plastic coated on both sides. Its resistance to chemicals makes this pump ideal for many chemical fluids.

Plated parts prevent corrosion. The pump is fitted with automatic drain back feature, brass valve seats and bakelite valve disc. It has an adjustable suction pipe, to fit either ¾", 1½" or 2" openings. The price is $17.75 complete.

Nordberg Bulletins

Nordberg Manufacturing Company announces publication of four new bulletins on its new one-cylinder 4½" x 5¼" Diesel engine. These bulletins, Nos. 166, 167, 167-A and 168, give specifications, detailed information and outline drawings of Nordberg Model 4FS-1 Diesel engines as adapted to power takeoff with and without clutch (167 and 167-A), generating units (166) and pumping units (168).

These four-cycle, one-cylinder Nordberg Diesel engines are rated as 15 HP at 1800 RPM and 10 HP at 1200 RPM. The units are compact, rugged power packages built to provide a dependable source of power over a wide range of applications. They are supplied completely equipped and ready for economical operation and long trouble-free service. The units are available for hand and electric starting.

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PACIFIC MARINE REVIEW

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BUSINESS ....

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....

Turbine Lubricating Systems

(Continued from page 46)

for proper circulation and settling of the oil before it passes out of the sump at the pump suction located at the aft end.

Ventilation. Ventilation of gear casings and of all lubricating oil tanks is a point which has had very little attention considering its importance. Venting of tanks is a problem which must be given individual attention on each installation. Vent piping should be of adequate size and so laid out that any condensation or vapor going through the vent lines or any deposits forming in these lines will not drop back into the tanks or gear casing. In many cases vent lines are joined to a single header and are of such length that return of condensate to the tanks occurs. Vent lines should be independent and not joined to a manifold or header. Vents should be fitted with strainers of the removable type for periodic cleaning. Mechanical air circulators and de-humidifiers have been found very effective in preventing formation of condensate in certain gear installations.

Coolers. Coolers, especially the two-pass baffle type, should be installed in an upright position so that they can be cleaned easily at short intervals. With coolers installed in an upright position, sediment will not lodge between the baffles, as can happen with coolers installed in a horizontal position.

Piping. All piping for the lubricating system should be laid out in such a manner that sediment will not accumulate in pockets or low points of suction or pressure lines. The piping design should permit easy dis-assembly for cleaning and inspection. Drain plugs or blank flanges should be installed at the lowest points in the circulating oil lines to permit complete drainage. In certain cases, final charges of lubricating oil have contained appreciable quantities of flushing oil because no provision was made for complete removal of the flushing medium.

The piping should be installed near and at the turbine and gear casing so that it will not interfere with the routine inspection of oil nozzles and nozzle strainers.

Heating Coils. At certain times it may be necessary to heat up the lubricating oil in a turbine system especially when starting up a cold plant. Some units are not fitted with heaters. Heaters should be installed either in gravity tanks, sump, or in coolers, whichever is most suitable for the installation. When the heating medium is steam, its pressure should be reduced to a maximum of 5 lbs. gage, to prevent local overheating of the oil.

Strainers. Lubricating oil strainers should be located before and after the pumps to permit the removal of any foreign matter from the system which might otherwise lodge in the coolers and gravity tanks.

All of the various groups responsible for the design and production of present-day vessels are doing an excellent job of giving the operator faster and better ships which will operate at low costs.

This paper was prepared after a number of conversations with engine builders, naval architects, and shipyard representatives. It was agreed that certain zones of divided responsibility existed where even greater co-operation would pay large dividends in still further reducing operating costs, maintaining cleaner lubricating oil systems, and extending oil service life.

New Method of Packaging Chain

A new method of packaging chain was recently introduced by the Campbell Chain Company of York Pa. after careful study of the requirements of industrial plants,

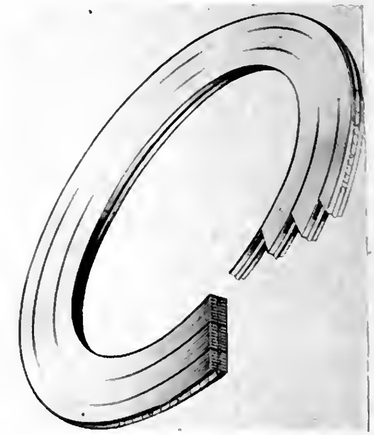
mill supply houses and hardware dealers and wholesalers. The new package consists of a telescopic-lid fibre board cylindrical container which holds approximately 100 lbs. of chain. The exact length and size of the chain is clearly marked on 2-color labels on the top and side of the container. The type of chain and also its Working Load Limit is printed on two labels to insure quick identification and greater safety in the use of the chain. Each chain end is tagged so that it is easily found in the container.

New Flexitallic Catalog

Recently issued by the Flexitallic Gasket Co., Camden, N. J., is a new catalog which gives the complete range of application of Flexitallic gaskets and gives dimensions and data for ordering.

Flexitallic Spiral-Wound Gaskets for marine application are now being made in a new basic thickness of .125 inch, in addition to the former standard thicknesses of .175 and .285 inch. Also introduced is a new Compression Gauge Gasket with an Inside Ring for high temperature and high pressure.

Sectional view showing spiral-wound construction of Flexitallic Gaskets.

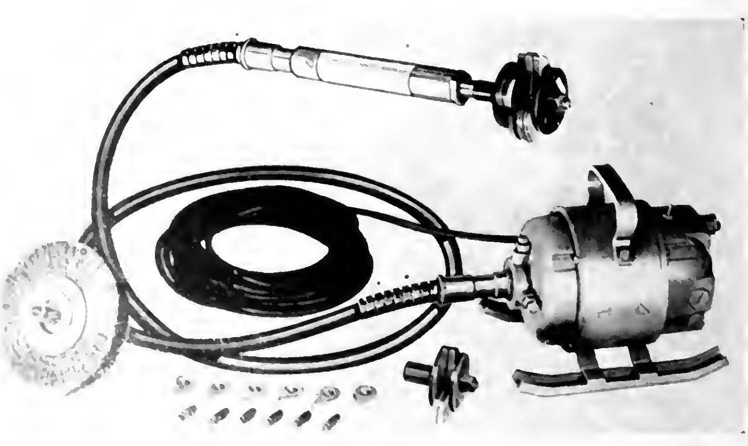


Rust Removal on Ships

The fleets of Moore McCormack, Grace, Isthmian Steamship, Marine Transport, and American Mail Lines, etc., have devised a quick and efficient method of rust removal with the Arnessen Electric Chipping Hammer.

Manufactured by the Arnessen Electric Company, New York City, this Chipping Hammer is a portable tool and can be handled efficiently by any member of a crew. It delves into seams, around sharp corners, and into complex angles. It operates from ordinary lighting circuits and can be used either on ship or ashore. Use of the Hammer saves time and labor and cuts rust removal costs from a tedious, expensive operation into a relatively minor and inexpensive one, and the Hammer can be serviced at any port of arrival.

The Chipping Hammer is powered by either D.C. or A.C. motor, and is equipped with a long flexible shaft.



Westinghouse Radar at Alameda Academy

Maritime students can now receive intensive instruction on the use of commercial radar, with a set which gives them first-hand experience under simulated marine conditions. The set—a three-centimeter Westinghouse unit—was recently installed at Alameda, Calif., Training Station of the United States Maritime Service.

Students taking the week-long course receive thorough training in the theory and operation of radar, as well as scope interpretation and radar navigational techniques. In addition, they receive approximately eight hours of practical instruction using the radar set. The set is installed on the school's "bridge" overlooking San Francisco Bay. Prominent features on both sea and land, as well as moving vessels, are spotted by students under the guidance of Lt. Comdr. Jack Halpern, USMS, who is the instructor in charge of radar and loran classes.

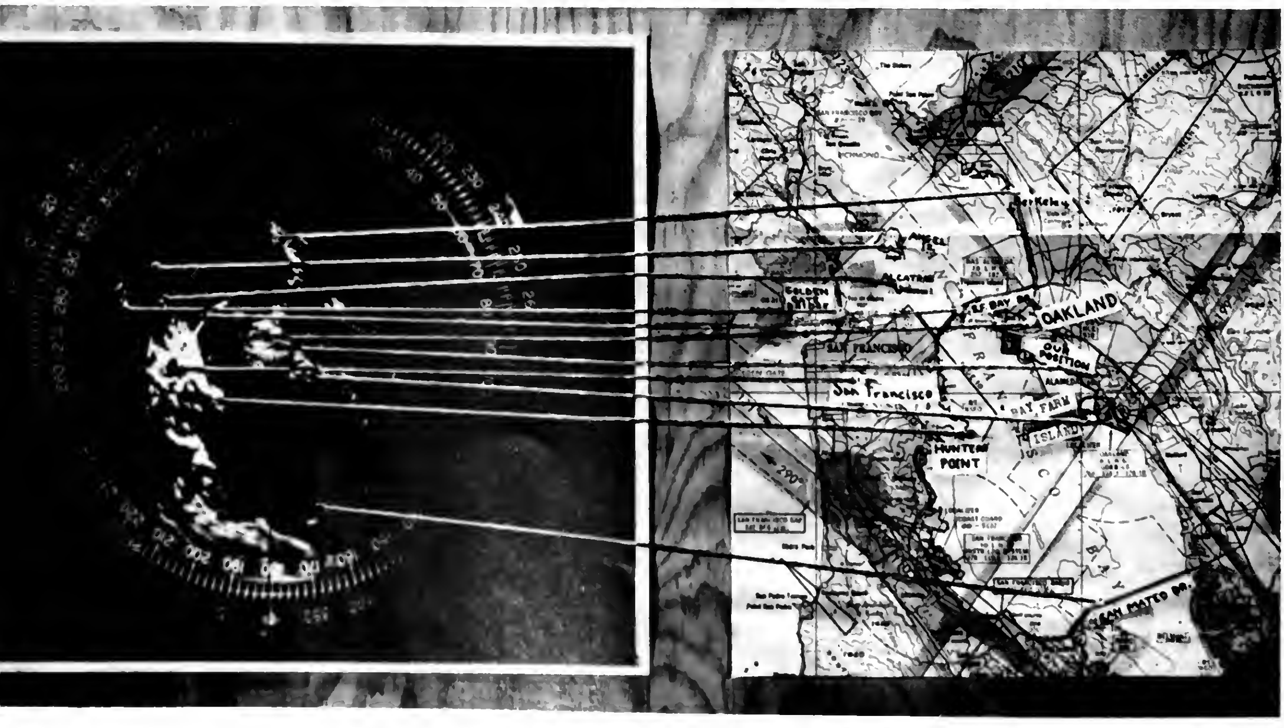
The Westinghouse radar set has a 50 KW nominal peak power output. The set consists of two parts: the viewing console, and the antenna-transmitter unit. The console, on the bridge, has four range settings; 1½, 4, 16, and 40 miles. The antenna, on the top of the "deck house", is of the enclosed radome type.

A student receives first-hand experience in the use of modern commercial radar at the United States Maritime Service Training Station, Alameda, Calif., as Lieutenant Commander Jack Halpern tells him how to adjust the brightness of the range markers. The 3 cm. Westinghouse Type MU unit was installed recently to provide students with practical experience in operating the latest commercial apparatus. The set is placed on a simulated bridge to provide a sea-going atmosphere as the student surveys the waters and shorelines of San Francisco Bay through the radar viewing scope.

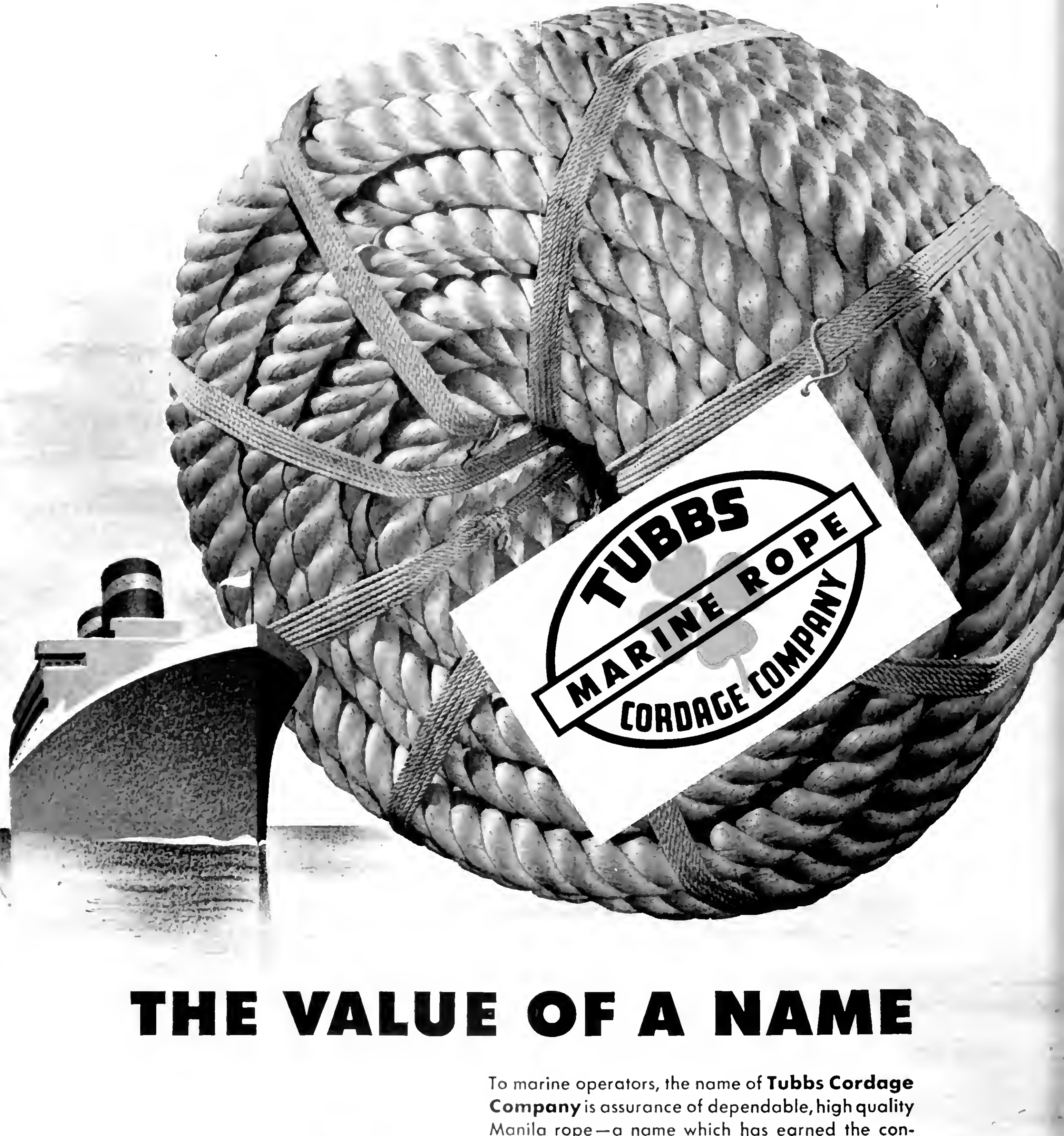
WESTINGHOUSE 16 MILE SCALE

Familiar land and sea features of San Francisco Bay show up distinctly in the scope of the 3 cm. Westinghouse Type MU radar set used for training purposes at the Alameda, Calif., training school of the United States Maritime Service. This picture shows how the radar "map"—known as a "Plan Position Indicator" or PPI—is mounted on a board directly in front of the radar set on the school's "bridge," to provide ready comparison with a conventional detail map.

NOTE: In the radar "map" photo, at left, the apparent lack of precise agreement between the scope's inner and outer scales is caused by parallax. This optical effect is the result of the necessary distance at which the camera's single viewing point was placed in relation to the radar scope at the time the original scope picture was taken.



Pacific MARINE REVIEW
DECEMBER 1949



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Shipping Subsidies Are Not Subsidies

PROBABLY few in the shipping business like subsidies. The industry was built by strong minded, ambitious men who, like the pioneers of all ages, lived for accomplishment rather than security. The hoped-for success was the incentive that spurred them on through hardships and personal sacrifices.

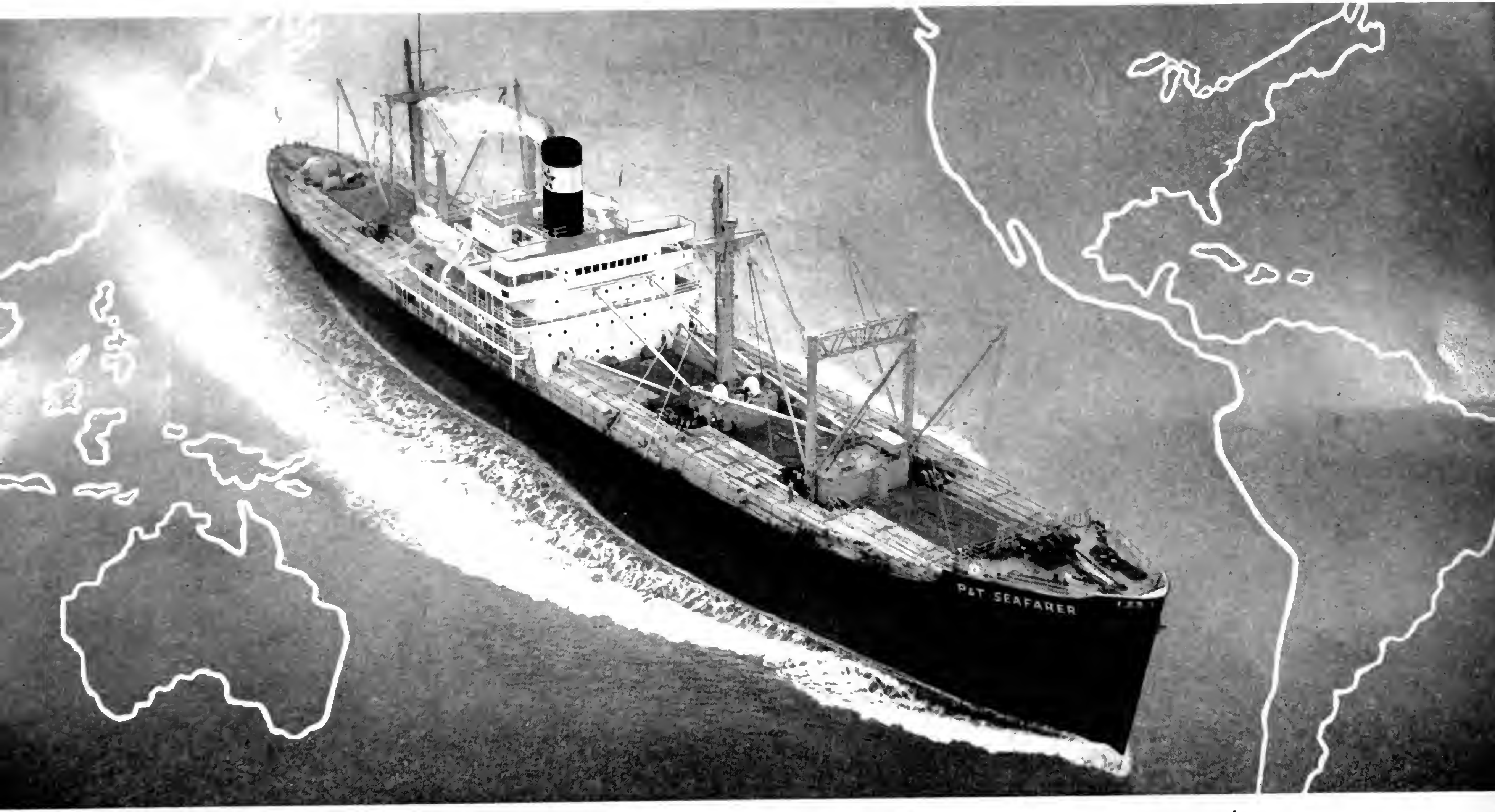
A subsidy from any source lessens incentive. It is a tow-line where horsepower is needed, and makes a barge out of a tug.

The commonly-called subsidies to shipping — or to shipbuilding — are not real subsidies; they are partial offsets to competitive cheapness, and enable a vital industry to function. Most of this competitive cheapness is due to foreign wage rates in ships and shipyards, but some of it is also to be found in deliberate underpricing, as by railroads, which have full knowledge that government-placed obstacles like canal tolls or slow-moving rating boards like the ICC are difficult to move. Some foreign countries are really subsidizing their ship industry, *and with American money.*

Aid to shipping is not a contribution to operators and builders; it is aid to workers so they may work and keep our ships sailing in a competitive world. It is not so with real subsidies, which seem to be required by an ever-enlarging circle of domestic producers so they may be assured of security in their production, even though it be surplus production, and so prices to the public may be kept up. For instance, there is the $500,000,000 cost to taxpayers to keep up the price of potatoes and peanuts, flaxseed and cheese. The Commodity Credit Corp. is reported to have operated at a loss of $599,000,000 for the year ending June 1949. We could go on about hogs and butter, copper and zinc, petroleum and oilseeds, and all the rest totalling to 10 billion dollars in 12 years—five hundred times the amount of aid given to ship operation. And the aid given for ship operation is *subject to recapture,* and most of it has been recaptured. Some lines have repaid in full.

The point is that shipping aid is not a subsidy. It is not a subsidy in the sense that the countless millions paid to aviation is a subsidy; (Eddie Rickenbacker calls this "coddling the airlines") nor is it protection in the sense that import tariffs protect domestic products. Tariffs hold prices up and the prices are paid by the public. Aid to shipping holds our shipping costs *down* to foreign levels. *And shipping repays this aid.*

Gentlemen of the farm bloc and the silver bloc and the tariff bloc and the labor bloc and others: Just because there is no "shipping bloc" to coaster-brake the ambitions and incentives of shipping heroes of industry for a competitive American Merchant Marine, do not stifle and hamstring the Maritime Commission in its efforts to keep our ships sailing and our sailors off the beach. Your inland farms and mines and factories need them for your success; you may need them badly indeed, one of these days.



Typical of the Pope & Talbot modern fleet is the "P & T Seafarer." The "Seafarer" is a C-3 converted to Pope & Talbot needs and this view is all-inclusive as to Pope & Talbot activities. The decks are piled with lumber, the cargo booms are unleashed, and the passenger staterooms are shown.

Pope & Talbot 1849—

As POPE AND TALBOT, INC., celebrates its centenary, it is one of the largest and most important industrial enterprises in western United States, and its success is directly attributable to the managerial ability of those at present at its helm. In consolidating a lumber and shipping empire in the prewar and postwar period, they have set a standard of attainment which few, in either industry, have reached. There is, however, a lot of background to this success.

If the present is the culmination of all the past, every forward stride and backward step of the Popes and Talbots during the three centuries of their history in the Western hemisphere has had its influence on today's success; and during the last 100 years the chart of the course has been influenced by many an able hand.

Up from Panama on the *Oregon* came Andrew J. Pope and Frederic Talbot, with plans for trading and for lumbering. They arrived in San Francisco December 1, 1849, and the next day the business of Pope & Talbot was in operation. Three months later Capt. William C. Talbot, brother of Frederic, brought his brig *Oriental* through the Golden Gate, completing his voyage of five months and 20 days around Cape Horn from East Machias, Maine. The *Oriental* was the first Pope & Talbot ship but not much different from 500 other ships as they rode at anchor or dug into the mud on the San Francisco waterfront. Many of those ships became buried in the mud and were covered by the "fill" which sent the waterfront eastward from Montgomery and Sansome streets to the present pier line, but the *Oriental* made many trips northward to Puget Sound in the then Oregon territory where the lumbering enterprise, foremost in Capt. Talbot's ambition, was to be developed in a grand way. The *Oriental* was sold in 1852, but the lumber and shipping empire's foundations had been laid.

Frederic Talbot, after less than a year in the West, decided to return to the eastern home of the family and his interest was bought by his brother, Capt. William C. Talbot, who thus permanently took his place as a partner in the firm. With Captain Talbot and Andrew J. Pope, the old and consuming interest, timber, soon dominated even merchandising in partnership thinking.

One of Captain Talbot's first efforts in the West was to be the organizing of an expedition to the northwest woods, and the securing of a mill site upon which to establish the mill and machinery, even then on the seas enroute from Boston. In the summer of 1853 the 50-ton schooner *Julius Pringle* was taken over, and with Captain Talbot in command, sailed northward from the Golden Gate on the long haul to the Straits of Juan de Fuca and around the Olympic Peninsula region into Puget Sound.

Boat and canoe parties set out from Discovery Bay to survey Port Townsend and Port Ludlow, and went on up the Hood Canal to Hazel Point and a place called by the Indians "Teekalet," later to be known as Port Gamble. There where thick Douglas Fir timber fronted the Sound for a hundred miles, a town was laid out, and the *Julius Pringle* was loaded with piles and lumber for return to San Francisco. As the vessel cleared the Straits, she hailed the *L. P. Foster,* inbound from the long haul

around the Horn and up the Pacific, Captain J. P. Keller in command, 154 days out of Boston with decks and hold loaded with the mill machinery for Pope & Talbot.

With the pattern of almost a century of living stamped upon it, Port Gamble is one of the most attractive places of the Pacific Northwest. While it is strictly a Pope & Talbot town with accommodation geared to take care of company needs, it is also a mecca for the tourist and fisherman. All the functions of an incorporated municipality are performed by Pope & Talbot executives, in addition to their regular duties, and the firm owns all the properties upon which Port Gamble is built, with a few small exceptions. The department store, almost of city proportions, post office, fraternity halls, church and the

George A. Pope, Jr.
President,
Pope & Talbot, Inc.

hundred-odd houses come under company jurisdiction and responsibility. So, too, does fire protection, street maintenance, painting, electrical and plumbing repairs and many other necessities.

Linked in a sense with the 80-room Puget Hotel at Port Gamble, built solely to take care of Pope & Talbot personnel (now open to vacationists and tourists), is one of the most colorful figures in the long annals of the company — Cyrus Walker. On a walking trip across Panama he had been induced to join forces with the original Pope and Talbot firm. He stayed the balance of his life with the Pope & Talbot Company to become one of its leading executives.

Within the hotel today are many pieces of priceless old hand-wrought furniture fashioned of black walnut in contrasting shades with intricate carved ornamentation, wooden peg hinges and heavy plate mirrors. They are a small portion of the collection from the big mansion of Cyrus Walker at Port Ludlow, in previous generations a world-renowned headquarters of seafaring men and lumber men from everywhere.

In those days most captains of sailing ships were traders for their owners or for themselves. Very often the captain would not have the money to pay for a cargo. In such cases Walker, at his discretion, is reported to have loaded the ship and trusted the master to pay on his next voyage, often a year and sometimes two years in the future. Months later, occasionally years, the ship would visit Port Ludlow again and payment would be made, often in gold, for the previous cargo. The captains generally brought back furniture and other gifts from all parts of the world for the Walker mansion which in time accumulated one of the finest collections of nineteenth century craftsmanship in the country. It is part of this collection that is to be found in the Puget Hotel at Port Gamble where it was moved after the Port Ludlow mill was finally dismantled in 1935. Much of the balance is to be seen in the old house at Port Ludlow, together with the workmanship that stamps it as outstanding in the West as an example of that period.

The little *Oregon,* already important in this story, rounded Clark's Point again on October 29, 1850, with deck guns booming, to announce the admission of California to the Union on the previous September 9.

For a time there had been considerable discussion of the advisability of logging the California forests but when these possibilities were carefully explored it was determined to fall back upon their original plan of sailing north and staking their future upon the Pacific Northwest. There, the Douglas Fir, prolific and far-extending, grew in quantity and these two men were to play a leading part in demonstrating that the Douglas Fir is the forest giant of the greatest use in commerce

Fred C. Talbot
First Vice-President,
Pope & Talbot, Inc.

know to this hemisphere. Upon it a large part of America was to be built in their lifetime and to this they contributed very largely.

This decision reached, and some profitable trading voyages having been made along the California coast, the young men proceeded with characteristic energy to prepare for the next move in their business venture. It was realized from the start that the move would require capital, a ship well suited to inland cruising, skilled millmen and as complete a mill as it would be possible to transport by sea. Those were the objectives of the partners when they retraced their steps over the long miles separating them from their former New England home,

but it was a vital step if the funds, men and materials were to be assured.

Once again in East Machias, in 1852, after traveling by way of Panama, Captain Talbot and Andrew Pope told their families of the great West and of their plans to develop lumber supplies to build the new empire that

Office of George A. Pope, Jr.

they could foresee on the Pacific Coast. Particularly were they interested in bringing lumber into San Francisco, whose future as a great city they had visioned with wonderful accuracy. With those arguments and that vision, they organized the Puget Mill Company, with the backing of families and associates.

At the old home town they found that a couple of friends and neighbors who had watched their venturesome journeys with great interest were eager to join their enterprise and had something substantial to put into the deal. Captain Josiah P. Keller and Charles Foster had the salt water and the Maine pine woods in their blood, like so many of their fellow townsmen. They also owned a new 180-ton schooner, the *L. P. Foster,* and this vessel they offered as part payment for a third interest in the proposed partnership. The offer was accepted, papers were drawn, total capital set at thirty thousand dollars, and Keller and Foster credited with ten thousand. The schooner was valued at $9,250 and the balance made up in cash, thus paying for the third interest.

Once more, characteristically, no time was lost. Calling their company the Puget Mill Company, the partners wrote an urgent paragraph into their agreement, stipulating that, . . . "It is further agreed that the said Keller shall take command of the said schooner, load her with boards or other lumber on the company account, proceed to Boston and there discharge the cargo, copper said vessel and fit out and furnish her for the voyage to Puget Sound at the expense and for the benefit of said company, and after taking on board said vessel such cargo as the company may furnish, proceed with all possible dispatch on said voyage to Puget Sound . . . "

It was obvious from the start that no vessel belonging to or associated with Pope & Talbot was moving anywhere without a paying cargo in her hold.

Andrew Pope conducted negotiations of a personal nature on this important visit to East Machias. Shortly after his arrival home he was married to Deacon Peter Talbot's daughter, Emily, the sister of his friend and life-long partner, Captain William C. Talbot. In Boston the partners ordered machinery and equipment for a sawmill, even the "pre-fabricated" mill building itself, and had everything stowed aboard the schooner *L. P. Foster* for shipment around Cape Horn, to meet in Puget Sound waters on an agreed date. That was all accomplished even before the principals had seen the vast timber lands of the Pacific Northwest.

Returning to the San Francisco office by way of the Panama route, with their eastern mission accomplished and the new lumber producing company at least in its initial stages, Andrew Pope undertook the administrative end of the business while Captain Talbot turned his attention to the search for forest wealth, with results that will be seen shortly.

Young Andrew Pope kept in very close touch with the old firm of William Pope & Sons in Boston, functioning as an agent for them, among his other efforts, out on the Pacific Coast. That was chiefly why he maintained a retail lumber yard and brick warehouse at the corner of Pine and Battery streets at this time. A look at the heading of his bills in the early fifties gives an accurate idea of the business he was handling:

A. J. POPE
Keeps constantly on Hand All Kinds of
LUMBER
— also —
Doors, Window Sashes, Blinds
HICKORY AXLES
OAK KNEES & TIMBER
Mahogany, Black Walnut, Cherry
White Wood, Shingles, Pickets
and Laths
TERMS CASH

Shipping went ahead constantly, for Captain Talbot cultivated markets far away while Andrew Pope conducted a brisk business in general merchandise, as well

The present modern building at 320 California Street in which the Pope & Talbot offices are housed. This is the center of the San Francisco shipping district. In the right background is the Federal Reserve Bank.

San Francisco waterfront prior to April 1851. This picture was taken from the Jenny Lind Theater, then located on the site of the present Hall of Justice. From April 12, 1849 to the end of 1950, during which period the Popes and Talbots arrived and started operations in San Francisco, 805 vessels came into the port carrying 62,000 passengers. Probably most of those vessels are in this picture and never left the harbor. The more or less indistinct numbers scattered over this picture mark the locations indicated in the key at the bottom of this page.

Scene at a Pope & Talbot sawmill dock in Pacific Northwest around 1900. Ships are loading lumber.

as lumber, in the coastal trade. An excerpt from a letter to Boston demonstrates his talent for keeping a weather eye on basic principles. "People can live without lumber" he wrote "but they must eat and drink. I think I could make a very good business shipping but a moderate quantity of this one article (sugar) as it is about as near Cash always, as flour is with you."

Ship captains could always find Andrew Pope interested in a cargo of sugar, candles, rice, ham and bacon in those days, whether to the west from Boston or to the east from San Francisco—provided the terms were satisfactory. Here is what he thought of candles as merchandise, expressed in another letter to William Pope & Sons:

"Candles are a nice article to ship in large quantity. Enormous amounts are consumed here and almost always

---

KEY TO NUMBERS ON PICTURE AT LEFT

1. S. H. Williams Co., S. E. Cor. Jackson and Sansome Sts.
2. Turner Fish Co., Sansome St., near Jackson.
3. Dunbar & Gibbs, S. W. Cor. Sansome and Washington.
4. Delmonico Hotel, W. side Montgomery, between Merchant and Washington.
5. Harry B. Lafitte & Co., 279 Montgomery St.
6. Merchant St.
7. Ship "Niantic," N. W. Cor. Clay and Sansome Sts.
8. Darling & Co., S. E. Cor. Clay and Sansome Sts.
9. Fay Pierce Willis, N. E. Cor. Clay and Montgomery Sts.
10. Buckley & Morse, S. side Clay St. between Montgomery and Sansome.
11. G. B. Post Co., N. W. Cor. Sacramento and Sansome.
12. New World Market, Leidesdorff, between Montgomery and Sansome.
13. Riddle Co., S. E. Cor. Clay and Montgomery Sts.
14. California and Sansome Sts., site of present Bank of California.
15. Site of the Montgomery block built in the early days and still standing at Montgomery and Washington Streets.
16. Site of present Pope & Talbot office.

pay well, and when they do not pay it is an easy article to keep, they pack away so easy. They do not injure in holding and is one of the prettiest articles I know of. You can easily make up a shipment of $5000 a month of these articles whenever you have any doubts about what to ship. Send candles, no danger of a loss as they are up and down often. Now worth 50 to 60c . . . "

The San Francisco waterfront in the 1850's stretched from Clark's Point at the foot of Telegraph Hill, at what is now Broadway and Battery streets, to Rincon Point, now beneath the terminus of the San Francisco Bay Bridge. Long Wharf or Central Wharf extended eastward from Montgomery Street between Sacramento and Clay streets. Lined with abandoned ships turned into stores, warehouses and hotels, it formed a business street and developed, after filling in around the piles, into the present Commercial Street. Montgomery Street, which for a part of its length was the waterfront, was lined on the shore side with ships and on the other side with import houses, assayers and such. It is still the financial heart of the West.

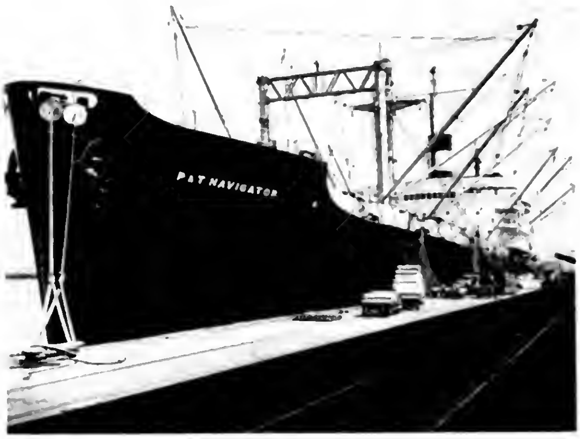
The original Pope & Talbot store was on Steuart Street between Mission and Howard, and the original Pope & Talbot lumber yard was in the block between Bush and Pine, Battery and Sansome streets, a block south of the company's present office.

The cabin originally occupied by Andrew Pope and the Talbot brothers was up the hill at California and Dupont (now Grant Avenue) which is the center of present-day Chinatown.

So much for the beginnings. We'll skip ahead a few decades.

Shipping

The two decades between 1880 and 1900 saw the Pope and Talbot lumbering and shipping enterprises expanding until the mills were turning out a million feet



"P & T Navigator" loading at Oakland dock.

of lumber daily and the company's nine sailing vessels, together with some eighty others in which they were interested, were carrying their product into every world port of importance and bringing general cargoes for the nation back to American cities in return. To serve the vessels and barges and log rafts doing their work, the company had created not long after the turn of the century one of the largest and finest fleets of tugboats in any waters, in Puget Sound and other coast harbors.

The really significant feature of this growth in mercantile shipping activity was that it happened while the nation's merchant marine generally was falling into decay. America had turned its attention inland. Youth and energy and capital were swarming across the plains and mountains to build the vast mid-west empire and the great cities and industries remote from the oceans. As shipping was neglected and the interior of the nation grew in size and power, United States overseas commerce was forced to find its way to world markets in

P & T tugboat "Wanderer" towing three P & T vessels into Port Gamble, Washington, about the year 1895.

Air view of Port Gamble, Washington.

foreign bottoms, to the detriment of the American merchant marine.

Just around the start of this period now under discussion the two founders of Pope & Talbot died. Andrew J. Pope was the first loss to the company and to the West, passing in 1878 and Captain William C. Talbot started his last voyage from Portland to San Francisco in 1881, succumbing at Astoria during that trip. But they had built enduringly and their example is the foundation upon which the firm stands.

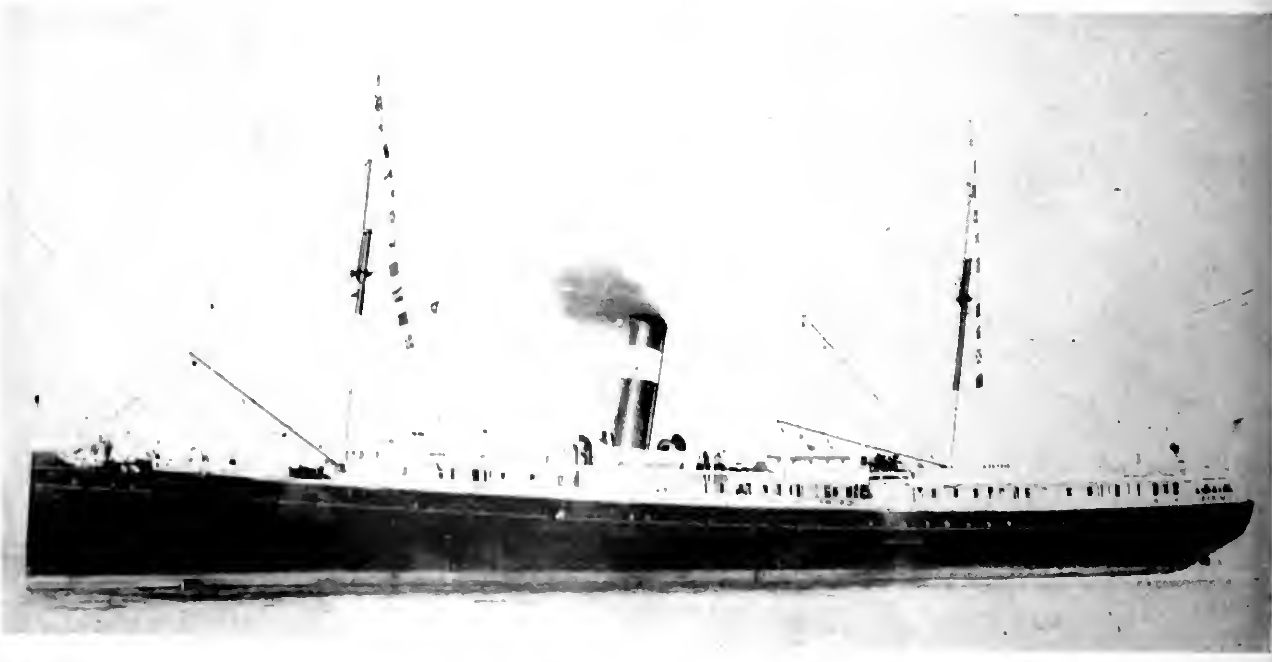
McCormick

When Charles R. McCormick came west some fifty years later than the original Popes and Talbots on the Pacific Coast, he shared their belief in manufacturing a product and distributing it by water highways with his own ships. That their paths were to cross and their affairs to become so intertwined, probably did not occur to either group in the earlier years of McCormick's career on the coast.

McCormick had taken over Eureka's Bendixen yard, moved it and its organization to St. Helens, below Portland on the Columbia River where he also established a sawmill and later was to build a big wood-preservative treating plant, and there thirty more vessels were launched. Some of them were designed to carry up to sixty passengers in addition to their hold and deck loads of lumber. Their star-designed funnel markers were soon among the most familiar marine sights along the Pacific Coast. It is worthy of mention that the McCormick auxiliary motorship, *City of Portland,* a five-masted schooner, built in 1916, was the largest wooden ship afloat. Constructed for the lumber trade and capable of carrying two and half million feet, the *City of Portland*

Tug "Pioneer," bought in 1892 and long a factor in Pacific Coast lumber towing.

Passenger steamship "Rose City." Acquired in 1924 with the "Newport," this was the first passenger and cargo vessel in the McCormick fleet.



was 278 feet in length, 48 feet beam, and under sail and power could maintain a speed of between 12 and 14 knots.

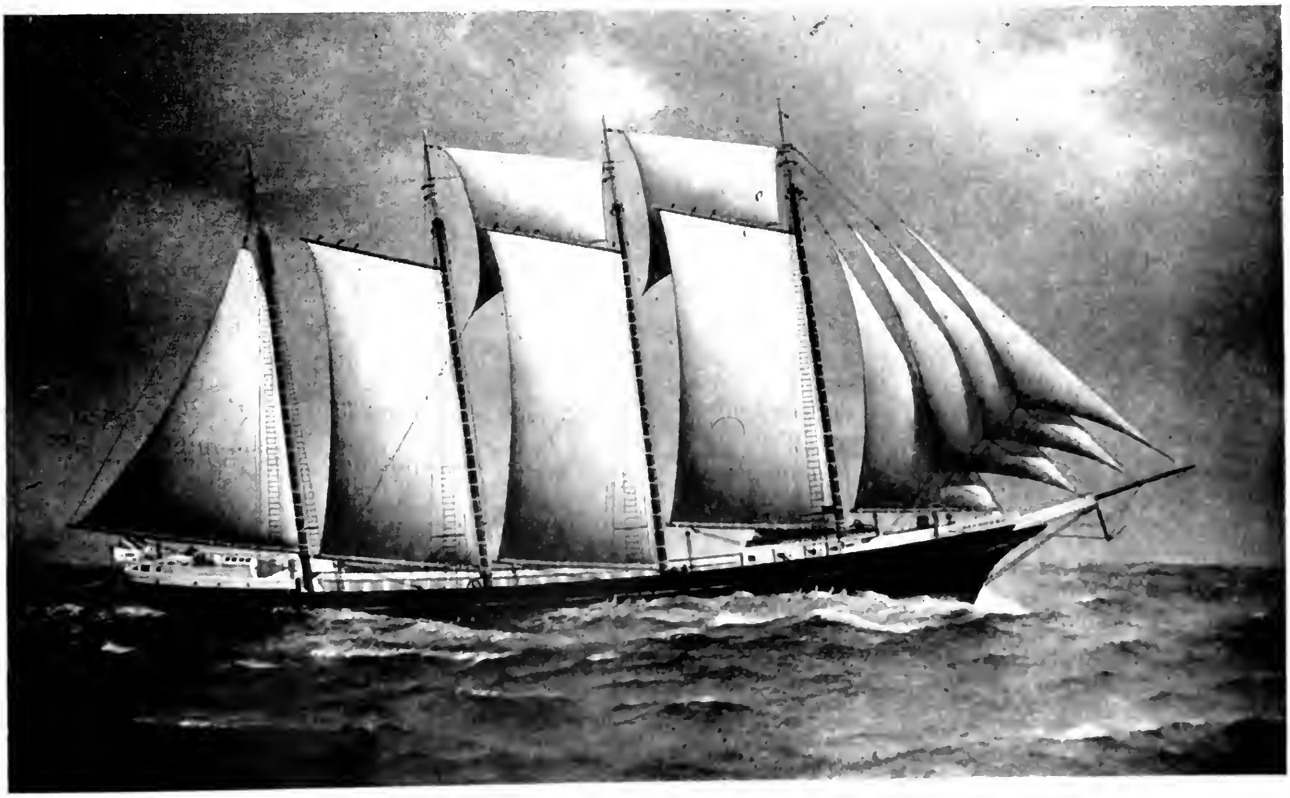
As the middle twenties approached they found the veteran firm of Pope and Talbot placing more emphasis upon lumber operations and the chartering of ships rather than purchase or building of ships to carry their sawmill output to markets. The McCormick interests at this period were fast rising to a position of great importance in sea commerce as well as in the forestry industry. Therefore, when a merger of the two companies was brought about, in 1925, on March 20 of that year, the result was a nicely balanced combination of mills and timber joined to a growing steamship power. Actually a new leadership in Pacific Coast industry had been created in one stroke; Charles McCormick had come a long way since he built his first lumber schooner in the shipyard at Eureka, northern California, a little more than twenty years before.

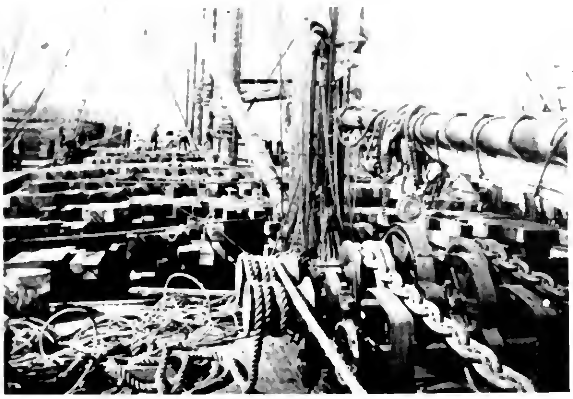
Puget Hotel, built and still operated by Pope & Talbot at Port Gamble.

Old bed at Pope & Talbot Puget Hotel, Port Gamble. Furnishings throughout the Hotel are similarly elaborate.

The Pope and Talbot families had long held a heavy stock interest in the McCormick Lumber Company, to whom their great interests were transferred in the Spring of 1925. Completion of the negotiations brought under the McCormick name around 80,000 acres of Puget Sound timber lands with some 2,850,000,000 feet of merchantable logs, sawmills and a wood-preservative treating plant with a potential annual production of 300,000,000 feet, lumber yards at Los Angeles, Riverside, San Ber-

"Okanogan," built for Pope & Talbot in 1895. The squarish sails, which are neither topsails nor squaresails, were added by the skipper.





"City of Portland," semi-diesel wooden vessel said to have been the largest ever built, deck-loaded with lumber for Australia.

nardino and Oceanside in California, sales offices in New York City, terminal docks at Seattle, Tacoma, Portland, San Francisco, Los Angeles and San Diego and the largest steamer service in the coastwise Pacific run. The McCormick vessels handled 45 per cent of the entire commerce between the western coast of the United States and the eastern seaboard of South America.

In 1921, four years before the acquisition of the Pope and Talbot interests, the lumber carrying division of the McCormick Lumber Company had become so large that the McCormick Steamship Company was organized separately to handle this part of the big business. The carriers were and had been for some time carrying the sawmill output from St. Helens, Port Gamble, Port Ludlow, principally to California ports. It was to avoid the practice of returning north in ballast that the company entered the general cargo transportation field and so widely did the ramifications of the McCormick organization extend that they grew eventually from the handling of twelve ships to the whole or partial operation of seventy-five vessels.

Intercoastal

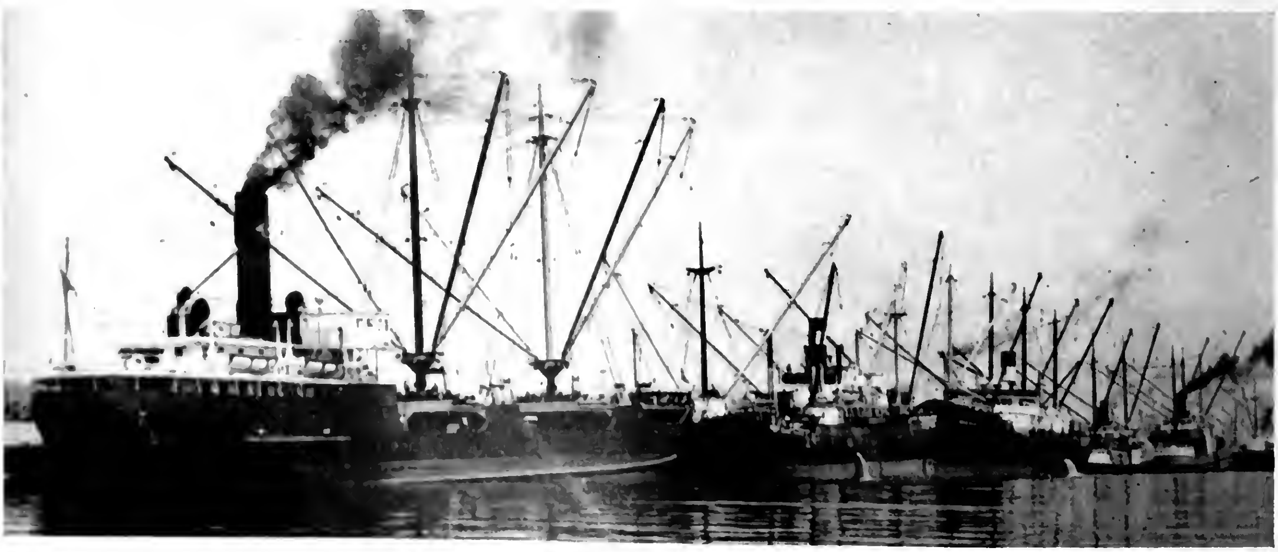
Following this expansion program, two years later the McCormick Steamship Company made a reciprocal agreement with the Munson Steamship Line of New York for the American Intercoastal route. That was in 1923 and under this arrangement steamers ran from New York and Baltimore to Los Angeles, San Francisco, Portland and Seattle. With the growing demand for water-borne commercial facilities, Boston, on the east coast, and Oakland, on the Pacific, were soon added to the schedules. In the next year, 1924, the McCormick Company acquired the San Francisco-Portland Steamship Company and the well-known steamer *Rose City,* running from Portland to San Francisco and Los Angeles, came under the McCormick house flag.

In 1926 the McCormick company absorbed the Los Angeles Dispatch line whose ship, the *Newport,* was also placed on the Portland, San Francisco, Los Angeles run, thus doubling that popular passenger and cargo route under the McCormick flag. Also in that year the McCormick organization, looking far afield, entered the Caribbean and South American trade, taking over the Pacific Argentine Brazil operations from the government and establishing the steamship line as one of the leading shipping firms sailing out of west coast American ports.

Following the merger of 1925, the leader of the newly-formed joint operation's steamship division was Charles L. Wheeler and for nearly thirteen years, this division continued to be known as the McCormick Steamship Company.

Under the Wheeler planning new lines were formed and new trade routes established. The Pacific Argentine Brazil was one of the best known, taking cargo and passengers through the Panama Canal and down the eastern coast of South America to the great seaports there. This

Early-day schooners at Inner Harbor, Wilmington, Calif. Pope & Talbot (McCormick) ships are in the foreground.



Charles L. Wheeler
Executive
Vice President,
Pope & Talbot, Inc.

E. N. W. Hunter
Vice President and
Assistant to
President,
Pope & Talbot, Inc.

line began in 1926 with a fleet often called the "West" ships — *West Notus, West Camargo, West Nilus* and others. In conjunction with the coastal and the intercoastal sailings, those vessels undertook to link the two Americas together in trading friendship. Cuba and Puerto Rico were on the southern schedules and the whole total of ship passages resulted in an amazing number of sailings inbound and outbound through the Golden Gate at their peak.

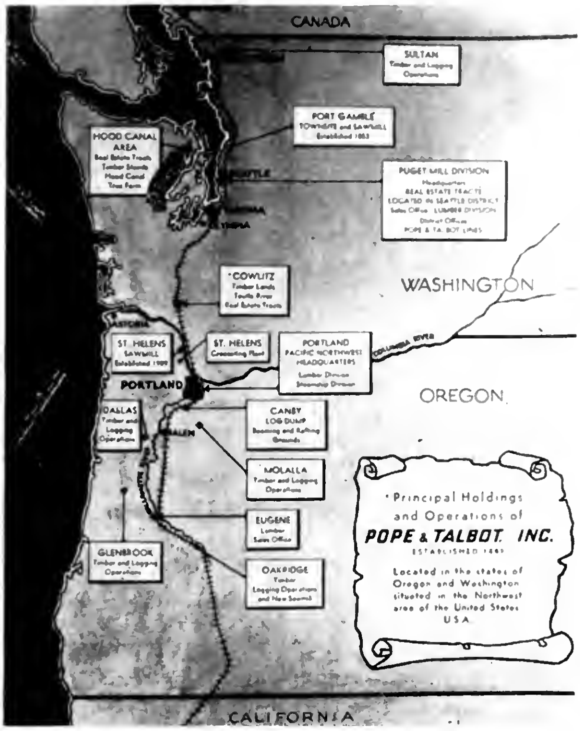
Charles R. McCormick himself did not remain long at the helm of the big concern which operated under his name. He was president for a time and was succeeded by S. M. Hauptman, an associate of long standing, with whom he had been in partnership in the lumber commission business back in 1903. And Hauptman was also closely associated with the establishment of the St. Helens Lumber Company, as well as the sawmill and the wood-preservative treating plant there in the years before the First World War.

William H. Talbot, son of Captain William C. Talbot, succeeded Hauptman as president and held the office until his death in 1930. Then George A. Pope, Sr., the son of Andrew J. Pope, assumed office and held that position in 1938 when, on June 4, the McCormick era came to an end and all activities and properties were formally transferred back into the Pope and Talbot name and jurisdiction, thus starting a new chapter of progress under the name so intimately associated with the west coast.

Again under this one central organization, with its long record of service and tradition, all the direction of the firm and its divisions and subsidiaries became concentrated in the two original families. The steamship lines, sawmills, logging operations, timber lands and offices, and agencies came back under the Pope and Talbot house flag, a banner that was soon to face another test of stamina and resourcefulness. When war struck again at America, on December 7, 1941, it found the Popes and the Talbots ready, as they had always been

Hillman Lueddemann
Vice President and
General Manager,
Lumber Division,
Pope & Talbot, Inc.

Gerald A. Dundon
Vice President and
General Manager,
Steamship Division,
Pope & Talbot, Inc.



The caption on this map reads, "Principal Holdings and Operations of Pope & Talbot, Inc. Established 1849. Located in the states of Oregon and Washington, situated in the Northwest area of the United States."

in every crisis in the nation's history, with men and ships and materials at their country's call.

Oakridge

Now completed at Oakridge, Oregon, about thirty-eight miles southeast of the university city of Eugene, is the latest of the Pope and Talbot sawmills, where cutting commenced in April, 1948. This represents the pioneer company's most recent contribution to the progress of the West and one of the most scientifically designed industries of its kind in the nation. Announcement of the Oakridge opening was made by George A. Pope, Jr., president, and Hillman Lueddemann and created great interest in the business world.

Reforestation

Forest management is apparently the answer to the problems of timber harvesting and re-harvesting annually, management that will insure new crops and protect them against the hazards natural to forests. The realization that "timber is a crop" and that it is possible to replace it with just about as much as is used every year, has had a lasting effect upon the thinking and the methods of leading operators. Far from exhausting the forest resources of the nation it is known now that they can and should be renewed and increased for future use of the world.

Pacific-Argentine-Brazil Line Restored

An event welcomed from Buenos Aires to Vancouver, B. C., was the resumption, early in 1947, by Pope and Talbot, of the liner service between Pacific Coast ports of America and the eastern coast cities of South America by the Pacific Argentine Brazil Line.

The Pope and Talbot action followed an extensive tour of the 17,200 mile route by the company's president, George A. Pope, Jr., in the latter part of 1946.

Pope reported then that the prospects for postwar trade into South America were excellent and that those commercial needs could best be filled by a wholly-owned and operated Pacific Coast company thoroughly familiar with every phase of western business. Purchased for use on the southern run were six splendid C-3 vessels, built for use as troop transports during the war and considered by experts in such construction the finest cargo vessels afloat. Now well known in so many ports, they are the P & T *Seafarer,* P & T *Trader,* P & T *Explorer,* P & T *Pathfinder,* P & T *Navigator* and the P & T *Forester.*

These combined freight and passenger carriers are equipped with radar, ship-to-shore telephones and other modern safety and navigation features. Each has a length of 492 feet and a beam of 69½ feet, a cruising speed of 16½ knots and deadweight cargo capacity of 13,000 tons.

The purchase of the C-3 type freighters at a cost of about $8,000,000 by Pope and Talbot for this traffic was a solid evidence of their faith in the future of the United States Merchant Marine and it was with this fleet that the firm started on the task of rebuilding and improving the Intercoastal, Caribbean and South American trade routes. The reconstruction was, of course, necessi-

View of the harbor and ancient buildings in the historic walled city of Cartegena, Colombia. A Pope & Talbot ship has just arrived.

tated by the fact that their maritime career was completely halted commercially when the Government took over ships and personnel.

The restored service today consists of three major routes. They are: (1) The Pacific-Argentine-Brazil line; (2) the Pacific-West Indies-Puerto Rico line; (3) the Pacific and Atlantic Intercoastal.

In addition to these lines the company acts as berth agents for a number of other shipping concerns. Pending adjustments in rates and other vitally important matters the company is not engaging in the domestic Pacific Coast trade with its own vessels.

The Pacific-Argentine-Brazil ships run both ways from Vancouver, B. C., Seattle, Tacoma, Portland, San Francisco, Oakland, Los Angeles via the Panama Canal to the east coast of South America, calling with cargoes and passengers at Trinidad, Rio de Janeiro, Santos, Montevideo, and on to Buenos Aires.

The Pacific-West Indies-Puerto Rico route formerly operated as a separate entity from Tacoma, Seattle, Portland, San Francisco, Oakland, Alameda, Los Angeles to San Juan, Ponce and Mayaguez in Puerto Rico, by way of the Panama Canal, both ways. Now, however, in conjunction with the intercoastal service which serves Puerto

Top: (1949) Hauling logs from a Pope & Talbot forest near Port Gamble.

Bottom: (1896) Sawing log into flooring at Port Gamble Mill.

Reforestation. Pope & Talbot have pioneered the replanting of cut-over areas. This picture shows a natural reproduction of Douglas Fir from seed trees that have been left on a logged area. These trees must be nurtured.

Rico on east-bound voyages it is known as the Eastbound via Puerto Rico.

Today

The modern general executive offices of the company at 320 California Street, in the most recently completed business block in San Francisco, are a very far cry from the cabin of the weather-stained brig *Oriental* in San Francisco Bay where most of the original affairs of trading were conducted in the spring of 1850 or from the lumber and brickyard of Andrew J. Pope at Pine and Battery streets in the early fifties.

But in the executive positions today are the descendants of the two founders and of their colorful associate in the old days at Port Gamble and Port Ludlow. For three generations the two families have guided the business policies of the organization, over a century of time.

George A. Pope, Jr., president of the company, is the son of George A. Pope, Sr., and grandson of Andrew J. Pope. Practically all of Pope's life has been spent with the company, commencing at an early age during school vacation periods as a helper in the sawmills at Port Gamble and Port Ludlow. Pope saw service during World War II as a Major in the Transportation Corps of the United States Army and succeeded his father as president in August of 1940. Under his direction the firm is in a strong position with a well-integrated operation divided between lumber, steamships and real estate activities concerned with the sale of the corporation's logged-off lands in the Pacific Northwest.

Fred C. Talbot, first vice president, son of the late William H. Talbot, former president and grandson of Captain William C. Talbot, co-founder, has also gained his entire business experience with the company. Talbot has spent the greater part of his time in the lumber division, starting in the logging camps and sawmills immediately after finishing college. Talbot held the position for some years of manager of the Puget Mill division and, like Pope, carries out the policies of the former chiefs in his administration of affairs.

Cyrus T. Walker, vice-president, is a son of Talbot Walker, and a grandson of Cyrus Walker whose career

Present-day Pope & Talbot vessel under San Francisco's Golden Gate Bridge.

at Port Gamble and Port Ludlow has been reviewed and who attracted very wide attention in the lumber and shipping industries in his generation. Walker acts as assistant to Hillman Lueddemann at Portland.

Charles L. Wheeler, executive vice president, has been with the organization since 1917 when he held his first position as manager of the St. Helens Dock and Terminal at St. Helens, Oregon. He organized the steamship division, moving to San Francisco in 1921. Wheeler became vice president and general manager of the steamship and lumber divisions in 1935 and was elected executive vice president of Pope & Talbot, Inc. on November 6, 1943.

Hillman Lueddemann, vice president, general manager of the lumber division and northwest manager of the steamship division, entered the steamship activities of the company at Portland in 1921. His successive titles include district manager and later the northwest manager of the steamship division, in 1935 the northwest manager of lumber and shipping, then vice president and northwest manager, and in 1946 he was also appointed general manager of the lumber division.

Gerald A. Dundon, vice president and general manager of the Pope and Talbot Lines, became part of the old organization in 1922, starting in the billing department in San Francisco and later becoming chief of the department. In 1926 Dundon started to handle outbound bookings for the Pacific-Argentine-Brazil and the intercoastal routes and was a valuable assistant in the freight traffic manager's office. Dundon went east to represent the company on the Atlantic coast in 1931, returning to San Francisco in 1947. His services to the government during World War II were of exceptional value and he is also credited with cementing splendid relationships between the government and Pope & Talbot, Inc.

W. Kenneth Pope, vice president, is a brother of the company's president, and has also been interested in the conduct of the business since his school days. Kenneth Pope was stationed for years in Los Angeles as southwest manager, and had early experience in the northwest properties, concentrating during recent years on the steamship division.

E. N. W. Hunter, vice president, joined Pope and Talbot, Inc., in December 1945 as assistant to the president, following war service with the Navy and the War Shipping Administration. Before World War II Hunter was with the Matson Navigation Company and the Newport News Shipbuilding and Dry Dock Company.

E. H. Harms is the operating manager of the company in San Francisco and joined the staff in May, 1925 as a rate clerk in the traffic department. After a short time in the Oakland office, Harms returned to his present department and during the war was a Commander in the Coast Guard of the United States.

Those are the executives who, with highly trained assistants, are chiefly responsible for the handling of the multitudinous activities of Pope & Talbot, Inc., in this year of 1949.

"P & T Pathfinder," one of six of Pope & Talbot's owned fleet of postwar C-3's.

The "Lightning" Epic

THE far-flung range of activity encountered and used in the operation and repair of vessels appears in the C-2 motorship *Lightning* of the Pacific Far East Line. Short of war experience, the story of the *Lightning* is about as fascinating as a ship story can be. She has, after a most complicated repair job, been returned to her run to the Orient after repair by the San Francisco division of the Todd Shipyards Corporation.

The *Lightning* was operating in Pacific Far East's Pacific Coast to the Orient run and encountered a typhoon off Okinawa last May 13. The typhoon struck her on the port side and tossed her onto a reef where she was stranded for 13 minutes upon which the reverse force of the typhoon struck her starboard side. She rolled over, and the tearing and corrugating of the plates flooded the hold and engine room.

The ship's bottom had been damaged from the stem to the after end of the main engine room, with most of the damage starboard extending from the centerline midway up the sides of the shell, while the port side was damaged from the centerline to the turn of the bilge. About 35 per cent of the bottom and about 90 per cent of the flat keel plates from stem to engine room required renewing.

Three separate repair jobs, two of them half a world apart, were undertaken, and by the time this story reaches the public the ship will again be in service on her old route.

The first repair was undertaken at Okinawa. When reports were received at San Francisco that the vessel was stranded, a representative was dispatched by air to Yokohama and then to Buckner Bay, Okinawa, along with a surveyor from the American Bureau and one from the U. S. Salvage Association. Crippled and damaged with water in her forward holds and main engine room, temporary repairs were made and water pumped out. She then made her way to Hong Kong where she was drydocked and surveyed. It was found impossible to make permanent repairs at Hong Kong and the ship was ordered to San Francisco. It had been found that in addition to damage to the auxiliary machinery which required a replacement of 50 per cent and repair to most of the

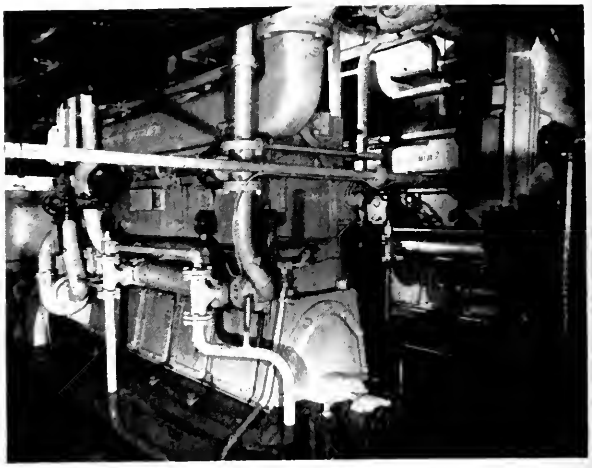
The "Lightning" at a San Francisco pier. This picture was taken before the voyage described in these pages.

remainder, the alignment of the ship had been disturbed, seriously affecting the machinery foundations and electrical equipment. So severe was the twist in the hull that it was necessary to send to the builders of the ship, Sun Shipbuilding and Drydock Company, for the mold loft plans for use in realigning the frame.

The main engines in the ship are Sun Doxford diesels with Cooper-Bessemer auxiliaries, the latter of which included five main and auxiliary generators. These were not only damaged by water but the foundations by which they were secured to the hull were twisted. In spite of these conditions, however, they provided sufficient power for the regular crew to bring the vessel home to San Francisco. They stood up under these severely unusual conditions without failure until safely within San Francisco Bay at which point the No. 3 main generator failed due to stresses in the foundation castings of this engine. The ship continued into the Oakland Estuary to the Todd Shipyards at Alameda where she was again drydocked for survey and the completion of repairs.

Picture above shows the corrugation which extended along a considerable length of the hull. The picture was taken at the Todd Yard at Alameda where the ship was repaired.

Because the ship had lost its shape, constant checking of alignment was followed at the Todd yard and targets were set to insure holding of the line of the vessel. One hundred and four plates and their internals were renewed. In order to fair the bottom plates into position the yard designed four 5-ton airjacks and employed them in all the bottom shell work, thus expediting the job considerably. The bulbous bow of the vessel was renewed on the starboard side through use of mockup. The hull repair work alone required more than 450 tons of steel and 35 drydocking days.



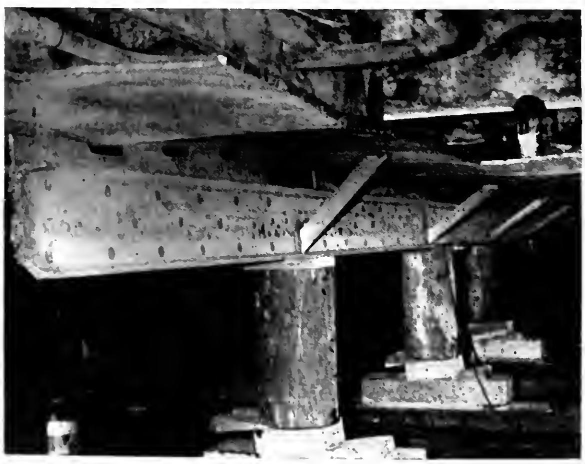
Part of the Cooper-Bessemer diesel installation on the "Lightning."

Right (page 67): Various shots taken of the ship on drydock at Hong Kong, indicating the difficulty of arranging supports for the vessel, and suggesting the extent of the damage.

Seventy per cent of the No. 3 hold double bottom was completely renewed and, also at No. 3 hold, the vertical keel was set up approximately 10 inches for the length of the hold, and the center vertical pillars were set up approximately 1¼ inches.

Having been completely submerged in about 10 feet of water, all the equipment in the auxiliary engine room was removed, completely overhauled and tested, proved in good operating order and returned to the vessel, as were all foundations which were faired in their entirety to correct damaged alignments. The auxiliary engine room, being an independent unit of the ship for maintenance of refrigerated space in Nos. 1, 2 and 3 holds, was cleared of water when the vessel was drydocked at Hong Kong and was not employed when the ship made

Below: This picture shows the makeshift supports placed under the hull at Hong Kong to keep the bottom from sagging as the ship crossed the Pacific. These beams were still in place when the drydocking at Todd's took place. Picture taken at Todd's yard.



The "Lightning" in Todd's dry dock as lower hull plates were being removed.

her way from Hong Kong to San Francisco. The equipment in the auxiliary engine room includes two Cooper-Bessemer diesel engines and attached generators, eight Carrier Freon compressors and associated motors, a switchboard, and miscellaneous pumps, panels and centrifuge separators. Greatly praised by the owners is this sturdy equipment, and the servicing facilities on the West Coast.

In the main engine room all the auxiliaries on the starboard side, lower level, were removed, overhauled and checked for alignment and proved in good operating order, associated foundations for the equipment were removed, checked for alignment, faired and all returned to the vessel.

The refrigeration repair work included the renewal of all tank top insulations on Nos. 1, 2 and 3 holds, which consist of 12 inches of corkboard. In order to perform this job, it was necessary to remove and replace grouting and mastic deck and, below those overlays, more than 1500 tons of concrete block ballast. Also removed and renewed were the Rock Wool sideshell insulation in Nos. 1, 2 and 3 holds, port and starboard, from tank top to underside of lower 'tween deck and bounding watertight bulkheads. All piping and cables between the auxiliary engine room and the various diffuser units in Nos. 1, 2 and 3 holds were tested to locate leaks, necessary repairs were made, and the system was proved in good operating order by a 24-hour cold test.

The *Lightning* was built in 1942. She is 453 feet 3 inches overall, with a beam of 63 feet 2 inches, a depth of 40 feet 6 inches, and a draft of 27 feet 2 inches. Her tonnage figures are: Gross 8591; net 5053; deadweight 8595, and displacement 15,125 tons. She has three decks. The vessel is a metal arc welded job with the exception of the sideshell seams, which are riveted.

The *Lightning* is one of several reefer ships operated by Pacific Far East Line, and is a fully refrigerated vessel.

Coast Guard Announces Examinations for Merchant Marine Officers

The United States Coast Guard announced that the next examination for licensed officers of the Merchant Marine for permanent commissions in the Coast Guard will be held on February 27, 28 and March 1, 1950.

Applications should be postmarked prior to February 15 to insure processing for this examination. Commissions will be offered in the ranks of Lieutenant (junior-grade), Lieutenant and Lieutenant Commander, depending upon age, experience and professional ability. All applicants must be between the ages of 21 and 40, and have served at least four years aboard a U. S. merchant vessel in the capacity of a licensed officer.

The examination is open to both licensed deck and licensed engineer officers of the U. S. Merchant Marine. Appropriate examinations will be given to each group. Application forms may be secured by writing to the Commandant of the United States Coast Guard, (PTP) 1300 E Street, N. W., Washington 25, D. C., or from any Coast Guard District Office or Marine Inspection Office.

The examination will be held in the following cities: Boston, Mass.; Chicago, Ill.; Cleveland, Ohio; Honolulu, T. H.; Ketchikan, Alaska; Long Beach, Calif.; Miami, Florida; New Orleans, La.; New York, New York, Norfolk, Va.; San Francisco, Calif.; San Juan, Puerto Rico; St. Louis, Missouri; Seattle, Washington; Baltimore, Maryland.

The commissioning of licensed officers of the Merchant Marine in the United States Coast Guard is part of the Coast Guard's Merchant Marine safety program. It is expected that the officers commissioned will be assigned to this duty; however, all officers commissioned from the Merchant Marine will receive a thorough indoctrination in regular Coast Guard duty including service aboard a major cutter.

Officers commissioned under this program are accepted on a two-year probationary term which will coincide with their training and indoctrination period.

The American Merchant Marine Conference
Propeller Club of the U. S.

AT the regular monthly luncheon meeting of the Propeller Club, San Francisco, held at St. Francis Hotel Wednesday, November 16, Club Secretary Eugene F. Hoffman, who was a delegate to the National Convention and Annual Meeting in New York the month before, reported as follows on Convention activities:

If attendance and interest are any criteria, I would say the 1949 Merchant Marine Conference and Propeller Club Convention was the most successful such meeting ever held.

Attendance and participation in the program included such distinguished public officials as U. S. Senator Magnuson, four of the five incumbent U. S. Maritime Commissioners, including the Chairman, General Fleming; a distinguished former chairman, Admiral Emory S. Land, and many other highly placed Government and Industry personalities.

Our own West Coast ports had sizable delegations —12 from Los Angeles, 8 from San Francisco, and a liberal sprinkling from the Northwest. Our delegation included General Bob Wylie, Captain Henry Blackstone, Merrill Gigy, Harvey Butt, Carl McDowell, Chaplain Ray Kjeldahl and yours truly.

Two things at the Convention impressed me above all others:

First, the solemn pronouncement of Maritime Commissioner Joseph Carson that the Maritime Commission planned an all-out program to promote the American Merchant Marine and bring home to every citizen its importance in our national economy and to our national defense. (*See page* 72.)

This very able and sincere Commissioner made an impassioned plea to Industry leaders and to the country's various patriotic organizations to get behind the Commission's program and give it the solid support it deserves. To that we can all echo "Amen!" There is nothing more important than to "sell" this industry of ours to the American people.

Since my return to San Francisco, I have learned the Commission has already taken steps to obtain funds for this project, in its 1950-51 budget.

The second thing that impressed me was the passage of two important resolutions memorializing the Congress on subjects of vital concern not only to this port but to American shipping as a whole.

One covers the Panama Canal Tolls situation; and the other, frankly, is a plea for the Government, through the military transport services, to get out of the shipping business and cease competing with private operators, who have tough enough time without such competition.

Louis B. Pate, Vice President, Seas Shipping Co., (Robin Line) was re-elected National President, and Norman E. Dunnavant, President of the Los Angeles-Long Beach Propeller Club, was elected National Vice President for the South Pacific Region.


Eugene F. Hoffman

Arthur M. Tode was given a Distinguished Public Service Award by Secretary of the Navy Francis P. Matthews in recognition of "exceptionally meritorious . . . service to the United States as one of the country's foremost advocates of an adequate American Merchant Marine and Navy . . ."

Mr. Tode, who asked to be relieved of the duties as "General Manager" of the Propeller Club of the United States, was elected an "Honorary Life Member" in the organization, in which he will retain his present title of "Honorary President." (Abstracts of papers presented at the meeting follow. Certain of these papers will be published at length in future issues.—Ed.)

The Potential Conversion of Liners To Military Transports

By WILLIAM E. BLEWETT, JR. Executive Vice President Newport News Shipbldg. & Drydock Company.

Blewett discussed the potential conversion of liners to military transports, and gave his audience a list of the characteristics desirable to obtain the maximum degree of safety and efficiency. He said these included speed, fireproofing and protection, capacity for troops, fuel, fresh water, supplies and equipment.

The shipyard official said it becomes the yard's job to incorporate as many of these features as possible in part or in whole into a vessel that is to be converted, in the shortest possible time. At this time, he added, there are very few passenger ships or so-called liners under the American flag which were designed to permit a conver-

sion that would produce the optimum vital characteristics needed for a transport, and he listed high speed, length over 500 feet and at least two-compartment subdivision with corresponding damaged condition stability as mandatory fundamentals.

"A merchant vessel," the speaker asserted, "is usually designed for a specific trade and converting to a troop ship means that the vessel has to be redesigned for an entirely different trade. However, during the design stage of a passenger ship a wide choice of arrangements is possible, and accordingly if the transport arrangements are considered at that time a much more efficient conversion can later be obtained."

Blewett contended that if conversions are to be made quickly and in a manner so that the vessel will carry the maximum number of troops and equipment with the maximum of protection, it is most necessary to have the conversion design, specifications and material lists prepared before an emergency occurs. He urged that complete and detailed information for the conversion work for each vessel be made available.

The speaker conceded his subject to be academic since the United States has very few passenger vessels sailing the seas that are fit to be converted into troop carriers. He pointed out, however, that six passenger vessels are presently under construction, with the designers fully cognizant of the conversion problems, so that the industry can expect facilities incorporated in these vessels which will permit their conversion to the best of troop ships.

"What I have termed conversion problems," he declared "resolve themselves in the completed vessel to so-called defense features, and it is exceedingly important that they should be recognized in the contract stage and in no way minimized for the purpose of economy."

Military Supplies and the Merchant Marine

By VICE ADMIRAL EDWIN D. FOSTER, (SC), USN, Chief of Naval Material, Department of the Navy

Admiral Foster outlined some of the areas of the field of military supply which are related most intimately to the effectiveness of transportation. He recalled that in the recent war some 676,000,000,000 long tons of cargo had to be moved and he said the successful completion of this task was due to the joint effort of the military departments and the merchant marine.

He said the task of our military supply systems is to translate the plans and stated material needs of our military operational commanders into the terminology of civilian industry, and upon completion of production to give time-place utility to this material

The Admiral said the aspects of military supply in which transportation plays such an essential role serve to re-emphasize the vital part of the merchant marine in our national defense plans He added that no adequate preparations for emergency can possibly exclude full provision for necessary cargo shipping space, which means a healthy, progressive merchant marine.

Shipments of Aircraft

By MAJOR GEN. WM. E. FARTHING, USAF, Department of the Air Force

Gen. Farthing's address called "The Wartime Shipment of Aircraft by Water" one of the major logistical problems solved during World War II. He said this sea transport accomplishment is best highlighted by 1944, when from one Air Force intransit depot at Newark, N. J., more than 23,000 individual aircraft were processed, loaded and moved by water to overseas destinations.

He added that almost 2,000 aircraft, more than enough planes to equip 25 active fighter groups, were shipped through this installation every month. The speaker said the job entailed the use of more than 8,500 people—military, civil service and contract—assembled at the depot, with the bulk of the 1500 contract personnel assigned to the processing lines on aircraft alone.

Gen. Farthing expressed the opinion that tankers must be used for future emergency transport of aircraft because they can carry more planes faster than anything afloat with the exception of an aircraft carrier. He said the tankers had the best damage records in the handling of planes, and added that they also are bound for the same places as the airplanes carried.

Civilian Hearing Examiners, Their Duties and Functions With Respect to Vessel Operations

By JAMES H. MOLLOY, Chief Examiner, United States Coast Guard

Molloy's address dealt with the duties and functions of civilian hearing examiners of the Coast Guard, with respect to vessel operations. He said that as products of the Administrative Procedure Act, they constituted a brand new office, and traced the evolution of hearing examiners from the formation of the Bureau of Navigation in 1884.

He said the work with which these civilian hearing examiners are chiefly concerned is the maintenance of discipline, morale, a high degree of competency, attention to duty, and conduct in the over-all interests of everyone concerned for the perpetuation of a firmly established American Merchant Marine.

The examiners do not concern themselves, he added, with casualities or complaints unless and until formal written charges and specifications have been preferred and filed with an examiner by the investigating unit of the Coast Guard.

Army Industrial Mobilization Plans

By MAJOR GENERAL FRANCIS H. LANAHAN, USA, Commanding General, Signal Corps Center, Fort Monmouth, N. J.

General Lanahan's speech was directed toward a discussion of the Army Industrial Mobilization Plan which, he said, was rather difficult to separate from the mobilization plans of the National Military Establishment.

The General explained that the National Industrial Mobilization Plan is to gain that irretrievable commodity —time, in the event of an emergency.

"In the execution of this vast program of planning industrial mobilization," General Lanahan declared, "there are numerous problems on which there will be striking divergence in opinions and views. To mention only a few, there is the problem of establishing the primary interests of the services at any designated industrial plant, the problems involved in planning for prime contractors and secondary contractors, establishment of the priority of the needs of the several services and numerous items of material, and the ever present problem of establishing proportion between the needs for the military and the needs for civil purposes."

The General remarked, however, that while the program of industrial mobilization is one of extreme importance, we must also keep in mind that in the final analysis the future of this country depends on the spirit of the people. A greater appreciation of the privileges we enjoy under our form of government must be developed he added.

Radar Navigation in Fog and the Rules of the Road

By ROBERT S. ERSKINE, N. Y.

In its present stage of development, he said, a vessel's radar cannot automatically avert disaster; it is the means of piercing the darkness, fog or bad weather so that a navigator can act upon the information received. He added that conflicting opinions have hampered the reliance of radar and possession of it in no way relieves the master of a ship from his obligation strictly to observe the requirements laid down in international regulations.

Erskine said that because of human nature it is probable that radar collisions will continue, but he expressed the opinion that they would be lessened greatly, if not eliminated, by official answers in such a form that navigators no longer would be confronted with the present uncertainities. He suggested that there must be, in this enlightened age, a speedier and more efficient means of dealing with the problem rather than by trial and error in the courts.

He declared that the problem of radar operation is sufficiently serious to warrant a call for another International Conference in the near future in the search for a proper solution.

Water Resource Development

By LACHLAN MACLEAY, President, Mississippi Valley Association

Discussing the potential value to the nation of its system of inland waterways, Macleay asserted that today, in the postwar years, the waterways are demonstrating again that they are not only a vital factor in the development of industry, but they are a distinct aid to other forms of transportation. Because the water carriers do build industry, he added, they are a factor in developing new business in finished products for the rail lines and the trucks to carry.

He said it was fortunate that the country's great system of waterways was ready when the Japs struck at Pearl Harbor. At that time, he continued, the waterways proved invaluable in helping break the bottleneck of transportation in the fuel shortage of the east. The speaker gave a thorough and rather detailed listing of the many uses the inland waterway system have.

Customers Must be Served

By A. E. KING, Vice President, Isthmian Steamship Co.

It was King's contention that International Trade must be the keystone for a sound, successful American Merchant Marine. The speaker confined himself to an informal review of conditions and reactions among our overseas customers and clientele as he observed them during a recent round-the-world trade-building and inspection trip.

King said that in all areas he visited the paramount questions related to currency problems were the already existent world-wide shortage of dollar exchange and the devaluation of sterling and other currencies tied to, or associated, with it. He asserted that the present effect of devaluation with regard to international trade appeared to be unfavorable to the U. S., and added that this effect must inevitably be passed on to the nation's merchant fleet.

He declared that the fundamental issue arises from the fact that whatever dollar exchange most other countries had has been spent or overspent in purchasing goods and services from the United States, and that they are now faced with existing dollar deficits which promise to become larger.

"It must be evident that areas which want to be customers of the United States, and which are in posi-

tion to furnish the United States with such vast quantities of materials which this country either actually needs or can advantageously use should not be placed in the category of gift-seekers," King said. "These countries are customers, good customers now and potentially much better customers. It is incumbent upon every segment of the American business community to recognize this vital fact and adopt it in our overseas dealings."

The speaker reminded the panel that it is important to recognize and remember that there is a strong desire in overseas areas to make progress not only in the field of production of raw materials or semi-finished goods, but to achieve some measure of industrialization as well. He said such efforts are especially noticeable in the Philippines, India, Ceylon, Pakistan and Indonesia.

King said each and every one of the countries he visited held much promise for the long range future of American trade provided it is developed by us along sound lines, and provided we Americans realize our foreign customers must be served and apply ourselves to that task with the same thoughtfulness and vigor customarily shown by Americans in achieving desired objectives.

The speaker mentioned that personal contacts with diplomatic and commercial representatives of this country that he met on the trip seemed to be well informed and anxious to cooperate. He said this attitude was a very hopeful outlook inasmuch as the success of our future efforts for the advancement of international trade will certainly require the cooperation of government with the business community.

The Responsibilities of Shippers of Dangerous Cargo

By Dr. W. G. McKenna, Chief Chemist, Bureau of Explosives, American Association of Railroads

McKenna recommends a single code for the handling of combustibles that will apply to all forms of transportation—land, air and sea. He traced the history of the present regulations which became Federal Law in 1908.

He said the regulations covering the movement of dangerous goods by common carriers are not static—that as new products are developed, new processes evolved and new conditions arise, the rules may be altered to provide for these new conditions. He added, however, that changes are made only after thorough investigation and discussion has shown a need for the proposed changes and that they can be effected with the assurance of a reasonable degree of safety.

Stating that commerce and trade are the life blood of the economy of all nations, the speaker asserted that it is the prime purpose of administrative agencies such as the U. S. Coast Guard, the Interstate Commerce Commission and the Civil Aeronautics Board to foster, protect, encourage and develop the commerce of this nation. He added that it is the obligation and responsibility of all shippers to observe the conditions defined in the regulations so that the Congressional intent may be realized.

He mentioned that several suits now pending involving the recent Texas City disaster undoubtedly will shed much light on the particular responsibilities and obligations of shippers.

Maritime Public Relations

By JOSEPH K. CARSON

United States Maritime Commissioner

Joseph K. Carson

EDITOR'S NOTE:

Having for a long while decried the inability of the Maritime Commission to present its case to the public, and to even answer its critics, we are pleased to publish excerpts from Commissioner Carson's forward-looking Public Relations program.

THERE is now pending before the Bureau of the Budget a request for an appropriation to finance a plan for the promotion of the American Merchant Marine. The Commission must, of course, convince the Bureau of the Budget and Congress that there is justification for the proposed program. I need not relate in detail the facts which justify the course the Commission proposes to pursue. You know the reasons but for the record let us suggest some of the highlights:

The President desires that the Commission undertake a program for the promotion of the American Merchant Marine.

Congress, in the 1936 Act, has directed the Commis-

sion to promote the American Merchant Marine.

The maritime industry is eagerly seeking a promotional program.

Labor urges that such a program be formulated and accomplished.

Veteran organizations are urging a strong and adequate merchant marine for trade, travel and defense.

History starkly reveals the necessity of a merchant

SALIENT FEATURES OF THE CARSON PROGRAM

Certain basic premises are fundamental to a successful program. These premises are as follows:

1. The active support and participation of maritime management and labor are essential and should be brought into focus through the establishment of a small but representative Advisory Committee.
2. The ablest talent in the media field should be tapped for guidance in the dissemination of materials to the public.
3. The Commission should have authority to go outside of government to contract for the development and execution of those phases of the program where such a course is indicated.
4. The Commission will have an administrative staff specifically identified for the promotional work to carry out the internal phases of the program, to produce and distribute material, to provide continuing contact with key public support groups, and to direct and assist contractors in their work.

In developing the specifics of the program, the following approach will be used:

1. The problem of promotion will be studied with the help of the Advisory Committee to be named. In this connection a series of regional conferences with various interested groups is underway.
2. The details of the program will be developed by the Commission's staff with the aid of technical specialists.
3. Contact with organizations outside of government such as veteran and labor groups; and educational, technical, civic and trade associations will be established and maintained.
4. Continuance of the program will be assured through maintenance of the production, distribution, and contact work by means of a minimum staff in Washington and field offices of the Commission.

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marine worthy of the strength and dignity of the United States.

National prosperity is dependent upon our merchant marine.

My interest in the merchant marine dates back many years. During the time I served as Mayor of Portland, Oregon, I was appointing authority of the Commission of Public Docks. During this period I came to know intimately the effect of the merchant marine upon the prosperity of that city and its hinterland. During periods of port inactivities all business suffered. Since becoming a member of the Maritime Commission I now see the merchant marine in its national scope.

It became evident to me, shortly after my arrival upon the scene, from the treatment accorded the Commission that at least two things must be done. They are:

1. A reorganization of the Commission along peacetime lines in the interest of efficiency and progress, and

2. The formulation and execution of a maritime promotional program to acquaint the American people with the fact that notwithstanding our wartime ship construction the United States flag vessels are being outclassed by construction of better and faster merchant vessels than those under the United States flag.

Efficient organization is being speedily accomplished and will be maintained as a result of the President's Reorganization Plan No. 6, the appointment of our fighting leader, General Fleming, our new chairman, and a willing and able staff. But our promotional program is yet to be made fully effective.

Where do we stand now? What does the public really know about the nation's need for the best merchant fleet in the world? Too few know the correct answer for national security. "Oh yes" some say, "Just look at the hundreds of ships we have in our reserve fleet. What is the matter with them?"

You and I know the answer. But how are we to make clear to the voters of this country that nothing in the world stands still, certainly not the merchant marine?

It is no secret that in the four years since the end of World War II there are alarming evidences of the lack of widespread public knowledge and appreciation of the role of the merchant marine in our national defense policy expressed in the 1936 Act.

The need for a national maritime promotion program is clear to me. While it is true that the industry itself

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Economical Developments On the C-1 Diesel Cargo Ships

By Stanley M. Lecourt, Research Engineer, Mississippi Shipping Company, Inc.

Lecourt told of experiments by the Mississippi Shipping Company with new-type propellers for C-1 vessels, and said the performance records of the M.V. *Del Viento* compared favorably with vessels using the original propellers and had shown not inconsiderable fuel savings.

The reduction in fuel consumption, he said, amounted to a total of 1,200 barrels of oil per year per ship. At the present price of diesel fuel this represents a saving of $4,020.20 per ship.

The speaker admitted that at this rate it would take about 2½ years of fuel savings to pay for the new propellers, but he said the additional value of the reduction in wear and tear on the engines, and the subsequent lower maintenance costs, justified the step. He added that his company had placed an order for four more of the new propellers earlier this year.

Lecourt also told of the installation of filters which resulted in a 51% reduction in lube oil consumption.

and said that parts replacement costs had also been substantially reduced as a result.

He indicated Mississippi Shipping Company's faith in diesel propulsion power by pointing out that its new 23,000-ton luxury-type passenger ship would be diesel-powered if the company gets its way.

Diesel Engines in the U. S. Navy

By CAPTAIN F. C. L. DETTMAN, USN, Head of the Diesel Division, Bureau of Ships, Department of the Navy

The speaker traced the increased use of diesels by the U. S. Navy and asserted that the high percentage of diesels in subs is a lead to the Navy's interest in this type of power. Capt. Dettmann added that the huge amount of diesel horsepower installed by the Navy during World War II was "earned" by the diesel engine on its own merit.

Reliability is the foremost requirement in the Navy for a power source, said he. All our peacetime efforts are to this end and no installation is satisfactory until we have achieved it.

He pointed out that when this country entered the last war we had frozen our design on four identical engines in a straight diesel electric drive, but he said that of all the diesel uses of the Navy the most distinguished service rendered by such engines was to landing craft.

Some of the Captain's predictions for future of diesel power in the Navy were—use of diesel propulsion in all combatant ships up to destroyers; most auxiliary vessels to be diesel driven, and diesel electric drive used in the larger of our diesel driven ships, subject to combat duty.

Use of Diesel Engines on the Great Lakes and Inland Waterways

By L. A. BAIER, Head of Naval Architecture and Marine Engineering, University of Michigan

Baier explained that he was discussing diesel propulsion power strictly from the viewpoint of a naval architect, who, he said, is a buffer or screen between shipowner and salesman. He quoted construction figures on the various types of marine power in this country, and said approximately 16% of new merchant propulsion power is composed of diesel units.

The speaker asserted that tremendous impetus had been given to marine diesel production during the war but he said the domestic totals were insignificant compared to European figures.

Baier suggested that the Great Lakes represented a highly potential market for the diesel engine builders that has been largely untouched.

Some Observations On Custom House Brokers

By BENJ. M. ALTSCHULER, Attorney, New York

Altschuler noted that much has been said lately on the necessity of simplifying our customs procedures and tariff laws in order to help the over-burdened foreign shipper and the harassed domestic importer, but he insisted that the maze of customs red tape falls on the customhouse broker alone.

In a defense of the work of the customhouse broker, the speaker credited his skill and sense of responsibility for keeping present-day imports moving through the customs' procedural barriers. He also urged squelching of the idea of permitting airline carriers, who are not licensed as customhouse brokers, to clear shipments through customs on behalf of consignees, where the value of the merchandise is less than one hundred dollars.

Altschuler also struck at the idea of government agencies providing their own services for clearing import shipments. He said Congress has seen fit to pass legislation requiring the government agencies on the export side to make use of normal commercial channels and argued that the same should be the case for imports.

Importance of Travel in World Commerce

By HERBERT A. WILKINSON, Chief, Travel Branch, Office of International Trade, U. S. Department of Commerce

The speaker declared that travel has been the forgotten partner of trade, and he offered some suggestions that might be helpful to steamship operators, exporters and importers.

He said that traditionally, governments, industry and universities the world over have directed their energies, their minds and their know-how to examining, developing and expanding their internal and external trade and commerce in goods. He deplored that at present people are not paying enough attention to human relations.

"Excellent as may be the effort to increase greater understanding through the interchange of goods, the results cannot be as quick, as warm, as vital as efforts made

to increase the personal acquaintance of people," Wilkinson asserted. "Goods and people make up this world. A tremendous amount of energy, research, thought, ingenuity and money has been spent ungrudgingly as a matter of course in developing the international exchange of goods. It is amazing that relatively so little energy, research, thought, ingenuity and expenditure has been directed toward increasing the international inter-change of people on friendly temporary visits.

"Travel is that partner of trade which represents the service of people moving temporarily away from their customary residence and source of income. This is true whether the travel be local or international. It is an energetic stimulant of the flow of trade in every instance."

Wilkinson expressed the opinion that each nation must make the development of travel an integral part of its commercial, economic, cultural, social, investment and development policy considerations. He said the technical work of the travel experts from the many nations should be supported and expanded.

Export Packing—Exporter's Viewpoint

By W. H. LUKENS, Export Vice President, R. M. Hollingshead Corporation, Camden, New Jersey

Lukens opened his address with the claim that "proper export packing develops foreign trade," and added that the goods which arrived in damaged condition are the biggest hurdle for suppliers in their quest for repeat orders.

He blamed the recent agitation for a Government Export Packing Code upon a few unscrupulous heads of export packing concerns who were seeking to replace business lost with the end of the war. He said such a code would undoubtedly require practically the same rigid and exacting type of packing as called for on military orders and lend-lease shipments.

"No one will question the wisdom of such packing for war purposes," Lukens declared. "However, as goods started to move in regular commercial channels, certainly the goods would not be subject to such treatment, and a return to normal export packing for many markets was in order.

"The rigid and exacting packing required by our military authorities was paid for by our government. When normal channels of trade returned, the American supplier could not afford to absorb such type of packing which would really be overpacking for goods to many commercial destinations."

The speaker contended that overseas port conditions have greatly improved and that this improvement had obviated the necessity for certain practices in packing. He pointed to South America harbors where goods had been forced to lie in vessels for months and to places like Manila where cargoes were stored in the open subject to all of the elements. He said such conditions have been either alleviated or eliminated entirely.

Those who get repeat orders, he said, know how to pack, and he challenged a contradiction of the statement. Overseas buyers are not suckers and they most certainly would not continue to buy from an American manufacturer whose goods were packed as deplorable as some claim and if the shipment arrives with terrific damage resulting, he asserted, and added that American packing is inferior to none.

The speaker listed a number of corrective suggestions which included proper claim records, careful selection of port labor and sea-going personnel, better methods of cargo handling and immediate repair or recooperage of damaged containers.

Export Packing—Insurer's Viewpoint

By R. BRUCE MILLER, Marine Secretary of the North American Companies, Philadelphia, Pa.

Speaking from what he called an insurer's viewpoint, Miller defended American packaging and stated he did not believe reports that Marshall Plan cargoes were arriving at their destinations in such condition that they were unfit for use. He added that personal observations last year in the ports of Rotterdam, Antwerp and Havre showed him nothing to support the more extravagant assertions made.

Miller admitted that he had seen some poorly marked cases, some badly designed crates that could have been readily improved by stronger skids and the use of diagonal bracing, but he contended the damage did not appear extensive and the packing faults could be corrected at very little expense. He said that while it was true that cargo loss and damage have been exceptionally heavy since the war ended, the losses and damages were not confined to American export shipments.

The speaker discussed various reasons for cargo failures and made a number of remedial recommendations. He urged that shippers try to design packing that meets the reasonably anticipated conditions of protection and storage while en route.

Training Personnel For the Merchant Marine

By REAR ADMIRAL TELFAIR KNIGHT, USMS, Chief, Bureau of Maritime Services, U. S. Maritime Commission

Admiral Knight outlined the various duties and responsibilities of the Maritime Commission's Bureau of Maritime Services, but he confined his address directly to the training of merchant marine personnel.

The Admiral said the training program, as it is presently constituted, is divided into four categories—the training of Cadet-Midshipmen to become licensed merchant marine and Naval Reserve Officers; the upgrading and specialist training of personnel already

serving with the merchant fleet; the training of a small number of new men annually, to qualify them for skilled positions in the merchant marine; and the training through correspondence and extension courses of licensed and unlicensed personnel of the merchant marine.

The speaker pointed out that the training conducted by the Bureau of Maritime Services has been greatly contracted since the very large activity during the war. He said we are now in a peacetime program, endeavoring to gear training to the needs of the maritime industry and also to maintain a nucleus of training facilities to enable expansion and supply all of the necessary personnel in case of a future emergency.

Some Urgent Problems In Work with Merchant Seamen

By THE REV. RAGNAR KJELDAHL, Chaplain and Program Secretary for Merchant Seamen, San Francisco.

The Rev. Kjeldahl, in reviewing the work of seamen's agencies, recalled that many had their inception in the religious-social awakening of the 19th century, and that many which sprung up like flash fires died without leaving a trace. He said one of the difficulties for such agencies came from their being squeezed between indifference from the community at large and suspicion and often open hostility from groups of organized labor.

The speaker traced the growth and prestige of British and Norwegian seamen's organizations and expressed the belief that there is a way toward an adequate program by groups in this country. He outlined one that has been tried successfully by agencies in related fields.

Maritime Education in College—Why?

By CARL E. MCDOWELL, Associate Professor, Graduate School of Business, Stanford University, and General Secretary, Sea Transport Mobilization Survey, National Security Resources Board, Washington, D. C.

McDowell said an annual total of more than 10,000 students, in at least 401 colleges in this country, are studying some form of maritime activity and are becoming indoctrinated in the techniques, policies and problems related to ocean transportation. He explained that this figure is exclusive of the men enrolled in State and Federal maritime academies.

The speaker discussed the functions of education, public relations and promotional publicity (propaganda) in getting the message of the American merchant marine across to students.

He suggested five ways in which the industry might improve its relationship to education. These included activation of the government's Interdepartmental Shipping Coordination Committee that now exists on paper. He said this might, among other things, clarify the position of shipping in all pertinent government policies.

Society's Opportunity to Help With the Alcoholic Problem

By WILLIAM WHEELAN, Alcoholic Assistance Bureau, Seamen's Church Institute of N. Y.

Wheelan's address discussed the problems of alcoholism among seamen and he made the claim that the problem is not principally one for the church to solve, but one for the general community to work out. He traced the work of the Seamen's Church Institute Alcoholic Assistance Bureau in behalf of merchant seamen.

Seamen's Agencies—Their Responsibilities To Marine Personnel and the Industry

By FRANK P. MITCHELL, Executive Director, Seamen's Branch, Y.M.C.A.

Mitchell spoke of the importance of good welfare facilities to our merchant seamen. He said it was the responsibility of seamen's agencies to educate the public to the importance of our merchant marine and the men who man our ships.

He said the responsibility of a seamen's agency is to help seamen live at their best, and called it significant that, with few exceptions, every agency with a record of long years service had its inception among religiously motivated people and is carried on by such people.

The speaker expressed a dislike of the term "seamen's welfare", and said seamen should be looked upon and treated just like other people. He called the merchant seamen the "red corpuscles" in the arteries of trade, and added that seamen's agencies are a measure of keeping this blood stream clean.

Cultural and Professional Training Of Merchant Marine Cadet Midshipmen

By CAPTAIN ALFRED F. OLIVET, USNR, Commandant of Cadets, N. Y. State Maritime College

The speaker traced the history of the New York State Maritime College from its start 75 years ago to its present-day Fort Schuyler installation. In discussing the aims

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Tankers Find Special Value in Radar

THE first Pacific Coast installations of the new large-scope Westinghouse MU-1 radar sets have just been completed on two Tide Water Associated Oil Company tankers, the M. V. *Tide Water* and the S.S. *Associated*. Use of the new radar sets is expected to aid materially in the maintenance of the "tight" schedules under which the ships operate.

Key units in the oil company's fleet, the ships transport petroleum products from Avon, the main Tide Water Associated West Coast refinery which is at Suisun Bay near San Francisco, to ports up and down the Pacific Coast. These include Monterey, Ventura and San Pedro, in California, as well as Portland, Tacoma and Seattle in the Pacific Northwest, and the Hawaiian Islands.

Capt. Louis J. Thompson, master of the M. V. "Tide Water," looks at the scope of the new Westinghouse MU-I radar set.

Because of the short runs and frequent stops, the tankers' ability to get in and out of ports with a minimum of delay is particularly important. Many of these ports of call, however, are difficult to enter with visual navigation during the frequent fogs encountered along the Pacific Coast. Some ports are up narrow channels, sometimes requiring high tide for navigation. Others, such as the mooring at Monterey, are at the end of a submarine loading pipe, marked by buoys and located well off land

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The radome of a newly-installed radar set appears as a huge mushroom atop the center "mast" of the 14,700-ton M. V. "Tide Water," moored at Bethlehem's San Francisco yard.

Suppose Canal Tolls Were Shown on Freight Bills!

[Editorial]

SHIPPERS on the West Coast have complained long and loud about the "nuisance charges" levied against water cargoes at Pacific Coast ports. These are charges like wharfage, car unloading, cooperage and handling which are billed separately from the ocean freight charges.

Because shippers see how much they are paying for these accessorial items, they eye the breakdown carefully and are eager to do away with these "extras".

Their complaints are bringing action too, by the U. S. Maritime Commission and by the steamship lines and the railroads to work out a billing method more acceptable to shippers and to absorb some of these charges and search for ways of reducing others.

Pacific Coast shippers have begun to take interest in efforts now going on to reduce another cost which is reflected in their freight bills. That's the cost of Panama Canal tolls, which are levied at the rate of 90 cents a ton against all cargoes passing through the Panama Canal. Shippers' representatives attended the "Citizens Committee" meetings on the subject in Seattle, Portland, San Francisco and Los Angeles, all held in the past thirty days under the auspices of port authorities.

But becoming a committee member is not enough. Shippers should be awake to the problem—and as active in it—as they have been in the "nuisance charges" campaign.

If Canal tolls were separate from other items on bills of lading so the shippers could see the 90 cent assessment on each ton which is passed on to them in the form of higher freight rates, maybe they would be as interested and as active as the port authorities and the working teams they've put together.

Shippers have a multimillion dollar stake in efforts at reducing Canal tolls. In the ten year period from 1930 to 1940, tolls paid on all Pacific Coast waterborne cargoes totalled $90 million. Postwar tolls are running about the same.

Since the Panama Canal was built in 1914, tolls have been charged against commercial ships passing through it, and thus in effect against commercial cargoes making the transit.

The basis of the shipping industry's argument is that there are two general types of cost at the Canal —National defense or government activities costs, and commercial costs. *All* Canal costs are included in setting the tolls. Shipping claims that only the cost of providing transit for commercial ships should be considered.

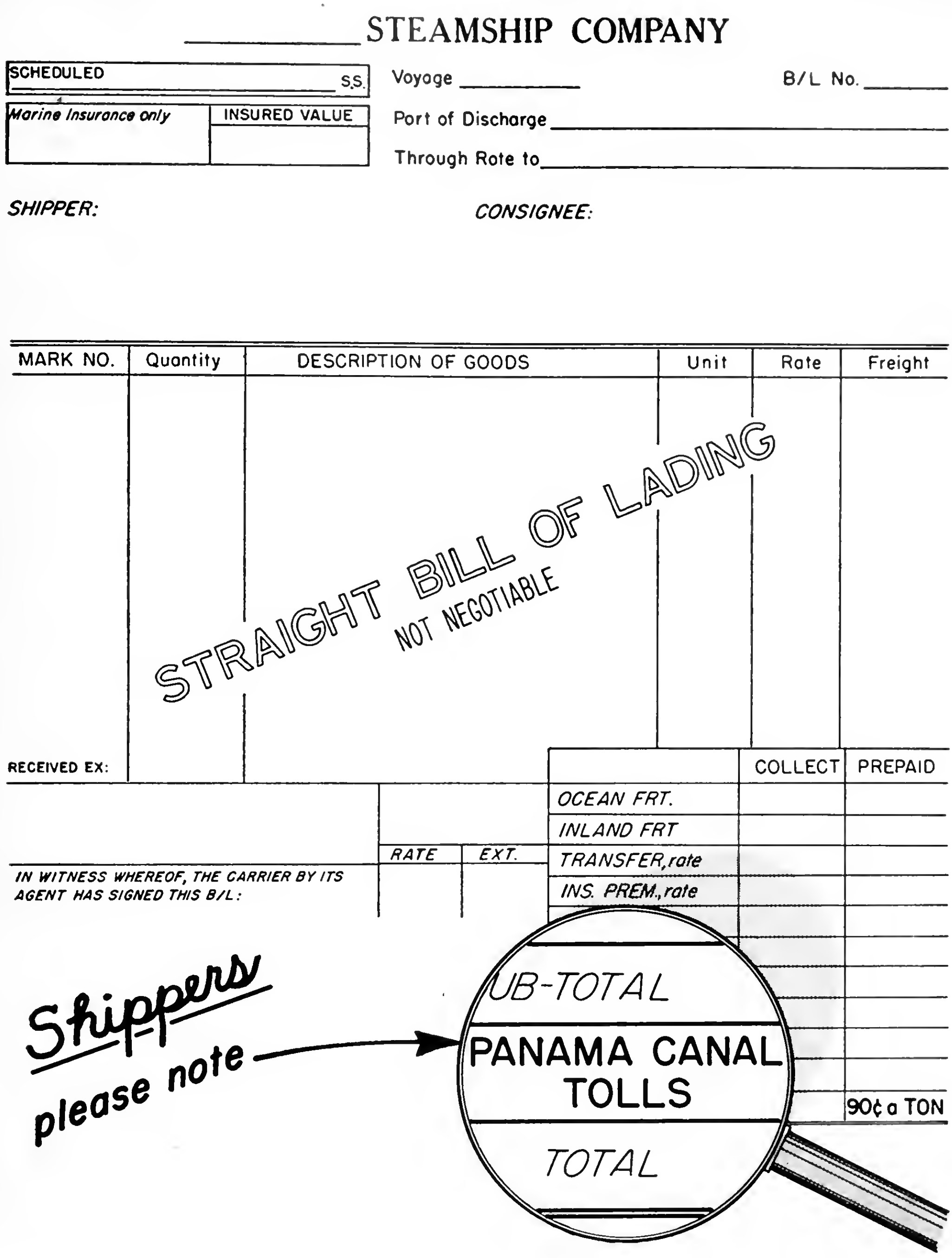
Orchids go to the industry represented by the National Federation of American Shipping for pounding out a policy in this Canal tolls fight which is fair to the government, foreign shipping, taxpayers, and the American operators. No free ride and no special treatment of American over Foreign or of one segment of shipping against another are asked. The four point policy asks merely that Shipping pay its own way *and nothing more.*

Orchids, too, go to the Pacific American Steamship Association for its ten page picture story of this highly technical subject. A series of ten charts with a minimum of words and a maximum of pictures, it tells the story with such clarity that a twelve year old could understand it. Produced by PASSA in large size, they were used as a basis for explaining the subject to the committees organized by the Port Authorities. So popular were the Charts that PASSA got requests for 1500 copies of reduced reproductions within a week after the meetings.

Shipper interest is, of course, in all factors going into ocean freight rates, and Canal tolls are one such factor. Shippers should remember that a ten cent per ton—11%—increase in tolls, to go into effect April 1, 1950, still hangs over their heads. blic as well. For intercoasttal ship lines, with only vaguely attracted by canal toll agitation. It seems that anything as remote as the canal holds little interest for them.

Furthermore, there is a general impression that only east-bound ships pay the toll, or that west-bound cargo is the worry of the consignee and not the industry as a whole.

All merchant ships pay tolls, *some $7000 each way.* West-bound cargo, as well as east-bound, is the worry of the entire industry and the entire public as well. For intercoastal ship lines, with only 65 ships in operation (only 18 owned), are the only factor keeping the transcontinental *rail* rates at a competitive level. Without intercoastal ships the rail rates would jump, West Coast costs would rise, West Coast manufacturing would suffer both in the West and in Eastern markets. They are already paying the canal tolls. This is really a problem for all business and civic groups in the West,



and not merely the hard-bitten intercoastal ship lines. This segment of shipping, which supported 125 ships prewar, must have more help in its postwar rehabilitation if it is to remain in the picture.

The problem is now with the Bureau of the Budget, which is expected to complete a study by about December 31. Thereafter, it is expected to be referred back to the House Committee on Merchant Marine and Fisheries for possible Congressional action.

Congressmen will be in their home districts for another two weeks before returning to Washington. There are enough shippers, large and small in the Western States, to contact every Western Congressman and Senator 100 times. And the range of shippers, large and small, is a true cross-section of the home-visiting legislators' constituents.

Enough said.

Shipbuilding in Japanese Yards

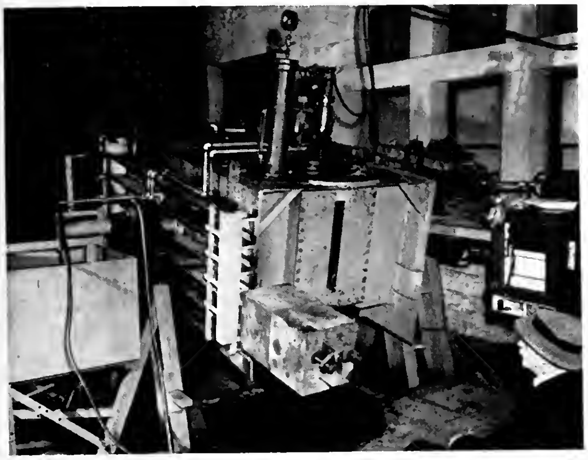
— Seagoing Vessels Classified by American Bureau of Shipping —

The interest aroused in our previous publishing of this list of Japanese-built vessels prompts its repetition. There is much business to be done by American suppliers.—Editor

Builder		Type—Size	Power	Owner	Tons
Fujinagata Shipbuilding Co., Osaka, Japan	S23	Cargo Vessel	Turbine 2200 H.P.	Toyo Kaiun Co., Ltd.	4,150 Gross tons 6,000 D.W. tons
Harima Shipbuilding Works, Aioi, Japan	449	Cargo Vessel 400'3"x57'9"x34'9" Launched 10-6-49	Turbine 3600 H.P.	Sanko Kisen Kaisha	6,000 Gross tons 7,600 D.W. tons
Hitachi Shipbldg. Co. Innoshima, Japan	3660	Cargo Vessel 400'x57'x35'5" Launched 10-8-49	Turbine 3600 H.P.	The Nissan S.S. Co. (The Sempaku Kodan)	6,200 Gross tons 8,200 D.W. tons
Hitachi Shipbldg. Co. Sakurajima, Japan	3661	Cargo Vessel 354'3"x49'3"x26'3" Launched 10-24-49	Turbine 2400 H.P.	Shofuku Kisen Co. Tokyo, Japan	3,700 Gross tons 5,250 D.W. tons
Kawasaki Heavy Industries Ltd., Kobe Japan.	900	Oil Tanker 501'10"x65'7"x37'9" Keel Laid 12-18-44	Turbine 6,000 H.P.	Iino-Kaiun Co.	10,000 Gross tons 14,500 D.W. tons
Mitsubishi Heavy Industries, Yokohama Shipyard & Engine Works Yokohama, Japan	S742	Cargo Vessel 341'2"x51'6"x26'3" Launched 10-7-49	Turbine 2400 H.P.	Sempaku-Kodan & Nitto Shosen Co.	3,690 Gross tons 5,400 D.W. tons
Mitsubishi Heavy Industries, Yokohama Shipyard & Engine Works Yokohama, Japan	S745	Oil Tanker 534'9"x71'6"x39'0"	Diesel 8500 H.P.	Mitsubishi Shipping Co. Tokyo, Japan	12,200 Gross tons 18,000 D.W. tons
Mitsubishi Heavy Industries, Yokohama Shipyard & Engine Works Yokohama, Japan.		Cargo Vessel 442'11"x63'x39' Keel Laid 9-6-49	Diesel 7000 H.P.	Nortuna Steam Ship Co. Panama City, R. P.	7,600 Gross tons 8,500 D.W. tons
Mitsubishi Heavy Industries Hiroshima Shipyard & Engine Works Hiroshima, Japan		Cargo Vessel 337'11"x50'6"x27'3½" Keel Laid 2-21-49	Turbine 2400 H.P.	Mitsubishi Kisen Co. Tokyo, Japan	3,700 Gross tons 5,250 D.W. tons
Mitsubishi Heavy Industries Kobe Shipyard & Engine Works, Kobe, Japan		Cargo Vessel 404'5"x57'5"x36' Launched 9-24-49	Turbine 3600 H.P.	Sempaku-Kodan & Osaka Shosen Kaisha	6,150 Gross tons 8,300 D.W. tons
Mitsubishi Heavy Industries Nagasaki Shipyard & Engine Works Nagasaki, Japan		Cargo Vessel 465'11"x64'3"x41' Hull 1410—Keel Laid 4-19-49 Hull 1411—Keel Laid 9-10-49	Diesel—Tw.Sc. 10,660 H.P.	National Development Co., Manila, P. I. The De La Rama S.S. Co. Manila, P.I. (Opr.)	10,000 Gross tons 15,500 D.W. tons
Mitsui S.B. & Engr. Co. Tamano, Japan		Cargo Vessel 344'6"x50'10½"x26'3" Keel Laid 3-23-49	Turbine 2400 H.P.	Sempaku Kodan & Kansai S.S. Co.	3,700 Gross tons 5,250 D.W. tons
The Nippon Steel Tube Co., Tsurumi Shipyard Yokohama, Japan		Cargo Vessel 400'3"x57'5"x35'5" Launched 9-21-49	Turbine 3200 H.P.	Kyoritsu S.S. Co., Ltd. Tokyo, Japan	6,000 Gross tons 8,200 D.W. tons
				TOTAL 15	103,090 G. T.

There are additional vessels classified by Lloyd's but whose names have not been reported to us.

Stabilization Reduces Ship's Roll By 80 Per Cent



Dr. Nicholas Minorsky is shown here with a model of a ship stabilizer now being tested at Stanford University.

STANFORD University engineers are helping to develop a ship stabilizer which will take the roll out of rolling seas.

The stabilizer is expected to transform the deck of a ship rolling in rough seas into a steady platform for naval weapons and aircraft carrier landings—and incidentally, to be a blessing to sea travelers subject to seasickness.

Theory of the stabilizer was developed more than a decade ago by Dr. Nicholas Minorsky, acting professor of mechanical engineering at Stanford during 1947-49. A model was built at the New York Naval Shipyard in 1938. Experiments with the model in the shipyard's materiel laboratory led Navy engineers to build a device which is now being tested aboard the minesweeper U. S. S. *Peregrine* off the coast of Virginia.

Two large tanks are installed on opposite sides of the ship. The tanks are partially filled with water, and the bottoms are connected across the ship by a duct. The instant the ship begins to roll, a sensitive instrument called an angular accelerometer, flashes a signal to pumping equipment which forces water through the transfer duct to the tank on the side the roll started, thus leveling the ship. By shifting the water from one tank to the other, Navy engineers expect to cut a ship's rolling at sea by as much as 80 per cent.

The device was briefly tested by the Navy in 1940 on the destroyer, U.S.S. *Hamilton,* before the threat of war sent the ship on patrol duty and cut short the experiment.

The model was stored by the Navy and experimentation was suspended for the duration.

Then in 1947 the model was brought to Stanford, where Professor Minorsky was serving on the engineering faculty. Two graduate students in engineering, Albert J. Morris of Redwood City, Calif., and Joseph H. Chadwick, Jr., of Palos Verdes, Calif., reassembled the device and placed it in operation under the direction of Dr. Minorsky. Chadwick is now observing tests of the stabilizer on the *Peregrine* in rough water off Norfolk, Va.

As a result of the testing, instrumentation and analysis of the model, the engineers have made some discoveries about locating the stabilizer aboard ship. They have found that the cross duct of the stabilizer—the line

(Please turn to page 130)

The ship stabilization system described on this page has been installed on the minesweeper "Peregrine" (at right). This ship is being given extensive sea tests at the Naval Shipyard, Norfolk, Va.

British Winch Motors Quickly Repaired By Westinghouse

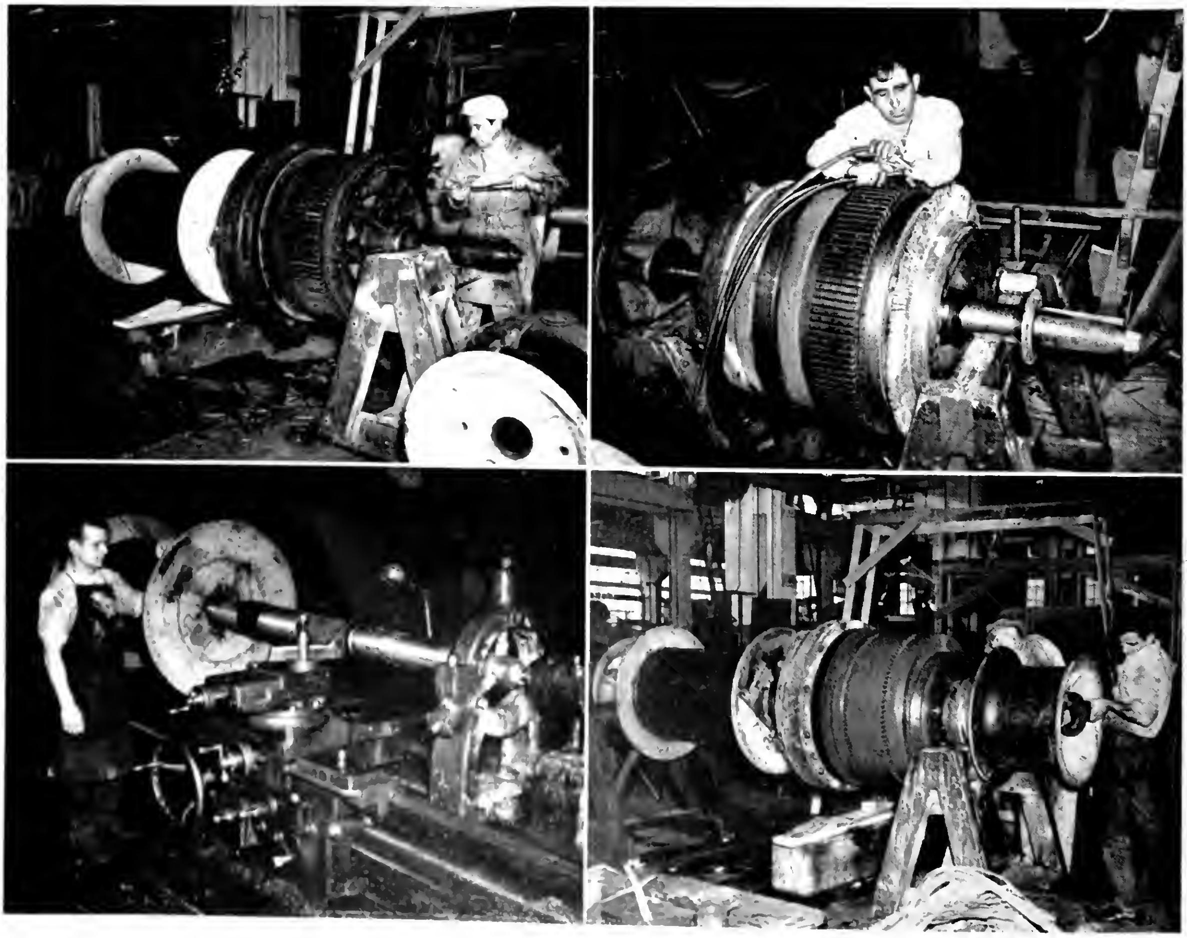
By E. H. HAUSLER

Electrical Service Supervisor, Westinghouse Electric Corporation

DURING a recent visit to San Francisco by a 10,000 ton British freighter, cargo handling operations had hardly commenced when two winch motors at one of the after holds failed almost simultaneously, followed quickly by a third winch motor failure at the number one hold, which curtailed discharge of cargo to a point where the ship's trip schedule was likely to be affected. The damage was so extensive in the case of each motor that complete renewal of armature windings and commutator insulation was indicated.

The ship, halfway around the world from her home port of Liverpool, was in an awkward plight. There were no spares. Furthermore, the motors were of unusually low speed rating (54 revolutions per minute) and, generally, of rather special design. From the accompanying photographs, it will be seen that the motor armature and such apparatus as planetary gearing, clutch and brake are all mounted on a shaft which also carries the drums and winch heads. Repairs to the armatures required that they be disassembled from this rather formidable array of mechanism. This job, therefore, was not of the strictly routine variety—particularly in view of the speed necessary.

After a consultation with Westinghouse engineering servicemen, the equipment was rigged off the ship at Bethlehem's San Francisco yard and trucked to the Westinghouse manufacturing and repair plant at nearby Emeryville, where inspection showed that many mechan-



ical items also needed repair or renewal. Both regular and special crews were set to making these repairs on a 'round-the-clock schedule. While some workmen were stripping out the old windings and dismantling commutators, others were winding, forming and insulating new coils, making new Mica V rings, cutting segments and doing other similar preparatory work. New bronze bearings were cast and machined. Shafts were built up by the electric arc process and finish ground, and eight days following receipt of the armatures in Emeryville, all of them had been completed and were back aboard, working cargo.

CAPTIONS FOR PICTURES ON PAGE 82

Top, left: After removal of one drum (visible in right foreground) and the commutator, the armature was stripped by James Colisas, and it was found that the mica on both the commutator and armature windings would have to be replaced as the result of oil damage. Note the unusually heavy construction and size of this electrically-powered British hoist and winch assembly.

Top, right: With a completely re-insulated commutator mounted on the armature assembly, this big rotor is ready for the next repair step—placing new coils in position. A Westinghouse Emeryville workman, Rodney Glazier, is shown touching up the tinned surfaces of the commutator risers, using a gas torch in his right hand and an air blast nozzle in his left.

Bottom, left: In the meantime, a major machining job was done on the shaft of another drum and winch assembly. Because of extreme wear as a result of long service, it was necessary to build up this shaft by the electric arc process. Westinghouse machinist Alfred Alberti then turned the shaft on the lathe, as shown in this picture. This operation at the Emeryville, Calif., manufacturing and repair plant, was followed by finish grinding.

Bottom, right: The unusual design and construction of this cargo winch and motor drive from a British freighter are seen in this picture taken after completion of winding on the armature. Using a king-sized wrench, a Westinghouse worker, Albert Sabbatini, is fastening the massive winch head in place just before the unit was shipped out of the Emeryville shop. Unlike equivalent apparatus on American-ships, this assembly has the drum heads all on one shaft, powered by a single motor. Clearly visible is the housing for the planetary gear interposed between the armature and the cable drum. The large motor turns at the slow speed of 54 revolutions per minute, and has a rating of 56 horsepower. The assembly is one of three similar units from the ship which were repaired in the shop at the same time.

Below: With repairs all completed within eight days, a major disruption in the trip schedule was averted.

New Electronic Tube Plant For Robert Dollar Co.

The Robert Dollar Co. opened their new H-K Gammatron Tube Division at 947 Broadway in Redwood City, December 5. The plant will manufacture Gammatron electron tubes for commercial radio transmitting, television transmitting, and allied uses. It will also make tubes used by the medical profession for shortwave diathermy, and those used in industrial induction heating apparatus.

R. Stanley Dollar, president of The Robert Dollar Co., in making this announcement added: "The new Dollar plant was designed and constructed to give maximum efficiency in high production electron tube manufacrure and to give the highest possible quality to the tubes manufactured. The interior of the building has been especially treated for dust proof operation and will be constantly kept filtered with dust free air and pressurized to a point where the pressure within the building is always greater than the pressure outside of the building."

In addition to the manufacture of tubes the plant contains a very complete engineering laboratory where a great deal of research and development will be carried on in perfecting new tube types for television, very high frequency, and microwave use.

R. W. Bunce, who has been with The Robert Dollar Co. since the days of Dollaradio in 1928, will be manager of the plant, while Wes Withol, the chief engineer, has had 16 years' experience in tube engineering.

The new Heintz & Kaufman Gammatron Tube Division will employ many of the personnel who formerly worked in the South San Francisco plant, and the company will continue making tubes for the military services in their various installations here and abroad.

In addition to the H-K Gammatron Tube Division, The Robert Dollar Co. maintains a Communications Equipment Manufacturing Division which will continue to be located at 50 Drumm Street, San Francisco. This division manufactures radio transmitting and receiving equipment, apparatus for frequency shift operation, ground to air V H F, and mobile V H F equipment.

Seamen's Book Drive Nets 5,000 Books

San Francisco's drive for books for seamen resulted in the acquisition of 5,000 books during "Books for Seamen Week," launched at a ceremony at Union Square by the Marine Committee of the San Francisco Junior Chamber of Commerce. This year's local book drive for the American Merchant Marine Library was the first since 1947. It is estimated that the Library needs 10,000 books to stock its rotating libraries at sea and ashore this year. The drive, conducted mainly through the 64 local Safeway Stores in San Francisco, the Emporium, the City of Paris, and Paul Elder's bookshop, received strong support from management, labor and civic groups.

Three weeks after termination of the drive, books were still pouring in to the Library at 105 Embarcadero. Contributions are always welcome; just telephone the Library at GArfield 1-8965.

Maritime Commission's Program

By PHILIP B. FLEMING, Major General, U. S. A., Ret.*

Major General
Philip B. Fleming

THERE is no need for me to review the long sequence of events, including two World Wars, which have so clearly established the compelling need of an active, efficient Merchant Marine. You all know that we must have ships for purposes of national trade and defense. And you know the danger of permitting our fleet and our shipbuilding industry to atrophy in the years ahead.

To deal with the recent criticism of the Maritime Commission in relation to the resumption of its shipbuilding program postwar, I might say that I am studying the Congressional report dealing with this matter. One of the major issues raised—that of the accurate determination of foreign shipbuilding costs—engaged my close attention as soon as I became Chairman. Not only have I just returned from a personal visit to European shipbuilding centers, but I dispatched our Chief of the Bureau of Engineering with his expert assistants on a fact-finding mission abroad. The results of his findings and our continuing study should enable us to dispel uncertainties now existing in the matter of foreign costs. It may be that our study will indicate the need for clarifying legislation to enable the Commission to carry out the intent of the 1936 Act. In that event, I am sure that the entire maritime industry—and that includes maritime labor—will join with the Commission in urging the consideration of such language by the Congress.

Ship Replacements

Among other duties the Commission is directed to study, perfect, and adopt is a long-range program for replacements and additions to the American Merchant Marine.

One of our biggest jobs is to evaluate the volume of trade on various routes—foreign and domestic. As postwar traffic returns to more normal patterns, what is likely to be moved in oceangoing ships? How much package freight and bulk cargo will move over essential trade routes, and how many passengers can be expected?

Then, as these traffic estimates become available, the Commission must determine what share of this potential traffic should be carried in American bottoms.

At that point we can estimate the number of ships that will be required. These estimates, in turn, must be carefully compared with our shipping needs for national defense.

Obviously these are essential prerequisites for a long-range program and that is why they must occupy a more prominent place on the Commission's agenda. It is true that we are not starting from scratch in this matter. A great deal of valuable research and analysis has been carried on. But I do believe that we can move ahead much more rapidly from now on.

We dare not risk a repetition of the situation that developed after World War I when we watched our American cargo vessels being crowded off the sealanes by more modern and more efficient foreign-built ships. Yet we will face that prospect unless and until we devise corrective measures to assure the progressive replacement of our war-built tonnage. Considerations of national security and the hard economic facts of world competition both demand that we reach affirmative decisions. The time for such planning is now.

The most effective way to avoid block obsolescence is through the adoption of a relatively uniform, progressive replacement program. From present indications the hard core of such a program will be the replacement of existing vessels, rather than any considerable *increase* in the volume of privately owned American tonnage.

Obviously any policy put forward by the Maritime Commission should take account of economic realities in the shipping industry. No other approach could be expected to encourage that cooperation from ship operators which is a prime purpose of the 1936 Act. The fact that we maintain, and will continue to maintain, an extensive reserve fleet has an important bearing on this subject—since serviceable vessels held in reserve have definite value for the entire Nation.

It is not my intention to discuss specific proposals designed to encourage the exchange of vessels or other measures that may be necessary to a sound replacement program. But I can say in all earnestness that I am anxious to join my colleagues in this very important undertaking. And here again we will not be sailing on uncharted waters. A great many soundings have been

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*Printed above are excerpts only from General Fleming's talk before the Propeller Club of the United States, Waldorf Astoria, New York, October 20, 1949.

The Webb Institute

FOUNDED BY WILLIAM H. WEBB in 1889, The Webb Institute of Naval Architecture concentrated in its first years on building and organizing. Its first class graduated in 1897.

A shipbuilder since the age of 20, Webb had always felt the lack of technical training on his part and it was with the idea of giving the business of shipbuilding a set of competent trained engineers that he founded the school. However, he had in mind what amounted to a high-grade vocational school and so he started it off with a 3-year course. Actually, the school never did function as a vocational institution but covered the same engineering ground in 3 years that other schools did in four. It did not, however, grant a degree so the course was changed to four years in 1909 and began granting a degree of B. S. in 1933, and in 1948 a Master's Degree.

During all these years the standards of the school have been maintained at a high level. During the 3-year course period, the school covered the equivalent of the ordinary 4-year engineering school and when the course was increased to four years it became the equivalent of an ordinary 5-year course. For example, the curriculm covers about the same subjects as given in a course in Mechanical or Civil Engineering and a thorough course in Naval Architecture and Marine Engineering as well.

The system of choosing students was inaugurated by Mr. Webb himself. They are chosen on a competitive basis, the examination being both written and oral. The competition for a place at the school is keen because a student is given a free education including tuition, board, laundry, medical attendance, books, supplies, etc. The number of students chosen annually varies from about 15 to 18. Students are required to have an average of at least 85% in mathematics and physics to be allowed to take the examination, they must be between 16 and 24 years of age and must be citizens of the U. S. Examinations are held at the school about the 1st of April but in the case of applicants who are at a distance from the school, they are allowed to take the examinations at home.

J. Lewis Luckenbach, President of the Webb Institute.

Rear Admiral S. M. Robinson, USN, Administrator of the Webb Institute.

When the Webb Institute was first started, it was located at the intersection of Sedgwick Avenue and Fordham Road in the Bronx. At that time this was practically a farming district and was near the Harlem River with its numerous shipyards. The school did not, however, have very much laboratory equipment and by the time of the second World War, the Trustees had decided to move to a location which was more rural and which would give more space for laboratory buildings and other equipment. The present site was the former Herbert L. Pratt estate at Glen Cove, Long Island, which covers 28 acres of land and 8 acres of submerged water front. This is one of the most beautiful estates on Long Island and the buildings already on it were perfectly adapted to the school's needs. The site was selected by a committee of which J. L. Luckenbach was chairman. Later he became Chairman of the Committee in charge of building operations and at present is President of the Corporation. He has been untiring in his efforts to provide the school with the necessary new buildings and to keep them in harmony with the buildings already on the

grounds. Laboratory equipment has been obtained from many donors, the principal one being the Navy Department. In addition to the main building which houses the students, offices, classrooms, physics and chemistry laboratories, living quarters, etc., there is a dormitory for the employees, a gymnasium with full sized basketball court, a model tank for towing models, a machine shop, carpenter shop, mechanical laboratory and electrical laboratory. There are in addition, living quarters for the Administrator, one Professor, the Chief Engineer and

Pictures on pages 86 and 87 were taken on campus and in classrooms of the Webb Institute. Part of the student activity is small boat sailing as indicated in the final picture. The school has a sailing fleet of six Comets.

the Chief Porter. The recreation facilities comprise two new tennis courts, two bowling alleys, billiard and recreation rooms and a waterfront having a new pier, a high speed motor boat and a sailing fleet of six Comets. The principal sports are sailing, tennis and basketball but many other sports are available.

The school has had a distinguished line of Presidents of the Corporation, beginning with Mr. Webb and including Stevenson Taylor, Walter McFarland, Lewis Nixon, Joseph W. Powell and J. Lewis Luckenbach. All of these men have occupied prominent positions in the shipping and shipbuilding world and have devoted a great deal of their time to improving the school. This is

undoubtedly one of the reasons why the school has continued to develop steadily over the years.

Graduates have reached high rank, not only in the marine field but in many other industries. One, for example, is the president of a shipbuilding company, another is chief engineer of a large aircraft company. A third, an international authority on vibrations, is a member of the faculty at one of the nation's leading engineering schools. The list could go on—chief constructor of the U. S. Coast Guard, research director of the American

Bureau of Shipping, head of the preliminary design for the Bureau of Ships, Navy Department.

In accepting the presidency of the Webb Institute, J. Lewis Luckenbach honored both the Institute and himself, for there are few men in the industry with his record of accomplishment.

Born in Kingston, N. Y., and graduated from Holbrooks Military Academy and Princeton University, Luckenbach took charge of maintenance and repair of Luckenbach ships on the Pacific Coast in 1912 and the design and construction of new ships for Luckenbach in 1915. He handled the building of some 35 ships in Japan and four in China for the U. S. Shipping Board in 1918, and then was with Luckenbach Steamship Company as vice president in charge of maintenance, repair and operation of vessels, from which he retired in 1925.

After seven years as executive vice president and acting president of the American Bureau of Shipping, he became president in 1933 and has held that position ever

since. He has been a member or delegate or chairman of many important conferences and technical meetings here and abroad, the latest of which was the International Conference on Safety of Life at Sea in London last year. He is a director of the Navy League, Vice president of Society of Naval Architects and Marine Engineers and of the Institute of Marine Engineers, London.

Administrator of the Webb Institute is Samuel Murray Robinson, Admiral, USN (ret.). Admiral Robinson was born in Texas in 1882, and after graduating from the Naval Academy and the Naval Postgraduate School, he served on many naval vessels and in the Navy Department's Bureau of Engineering, Office of Procurement, and finally as Chief of the Bureau of Ships. Included in his long naval record was the management of the Bremerton Navy Yard. He has been with the Webb Institute since 1946.

Radar in Tankers

(Continued from page 77)

in open water. If the weather has closed in, such a small "pinpoint in the sea" is extremely difficult to find by visual navigation.

With radar, the ships will be able to make high tide crossings or entries as planned, and take full advantage of the short turn-arounds possible with the quick loading and unloading of tanker cargo. The radar is expected to save thousands of dollars annually in operating costs.

The Westinghouse set is designed for maximum navigational accuracy. It has a 12½-inch scope, one of the largest in commercial use. The scope is flat-faced, to eliminate parallax at the outer edge of the screen, and has a range finder to indicate distance to points shown on the scope. There are six range settings 1, 2, 4, 8, 20 and 40 miles.

The radar installation on each ship is in three parts: The console and transmitter are located in the bridge house. The antenna is mounted atop a mast, inside the Westinghouse radome which protects it from the elements.

Corrosion Testing Station At Kure Beach

FOR 15 YEARS the Corrosion Testing Station at Kure Beach, near Wilmington, North Carolina, has put the ocean to work on clues to end the damages caused by sea water, sea air, and sea-nourished marine growth.

At the start, the primary purpose of the project was to study the comparative performance of alloy and plain carbon steel in salt water service. But the project literally grew before it was born. The first steel samples had not had an opportunity for exposure before additional materials, non-metallic as well as metallic, were placed in the schedule for testing.

What had been planned as a small rack covering a few square feet has now grown until it crowds a marine basin about 1/3 of an acre in area and holding over a million gallons of sea water. an atmospheric test lot and salt spray racks containing over 2,000 specimens.

During the past year, additional sea water testing facilities have been added at Wrightsville Beach, about 20 miles away. Here, about 1,000 specimens are exposed.

Besides these open air and open water studies, the greater part of the floor space of a pump house. 50 feet by 150 feet in size, once used by the Ethyl-Dow Chemical Company before the closing down of its Kure Beach bromine operations, is now being devoted to the testing of scale model condenser units and other equipment for resistance to attack by corrosion as well as by impingement and of accelerated destruction resulting from the combination of the two.

How much has been spent on the project during the decade and a half of its history is almost as much a matter of guesswork as is the amount of damage suffered by industry through sea water and sea air attack during the same period. Many of the specimens exposed are of special composition, hand tailored, as it were, for purposes of studying destruction and its prevention. Representing special heats, pretesting, and special handling, actual cost figures are not readily available. Scores of producers have sent their samples for study. The Army, Navy, and other departments of the government have used the facilities of the station for tests of their own. Currently, they are engaged in dozens of studies of all the deteriorating forces constantly at work under natural conditions at Kure Beach.

The project originated with F. L. LaQue, in charge of The International Nickel Company's Corrosion Engineering Section, and has been developed and expanded under his direction since its inception The bulk of the operating and maintenance cost has been borne by International Nickel, though Dow Chemical Company, Carnegie Illinois Steel Corporation, Armco, and other producers are sharing some of the expenses. In addition, producers of materials under test supply their own specimens.

As a cooperative effort on the part of industry to provide users with better and more durable materials and equipment, the project has aroused tremendous interest because of the manner in which data have been freely exchanged among competitors. One example, for instance, concerns the studies of titanium and zirconium. Both now are commercially expensive, but—like aluminum—may eventually come into common use with lowered production costs to compete with metals and proprietary alloys now in general industrial service.

A group of trade and technical magazine editors, representing widely diversified fields of industrial publications recently made a 2-day inspection of the corrosion testing facilities at Kure Beach and at Wrightsville. Each found the work being carried on of special significance in all these fields.

They found studies being made, for instance, of ma-

(Please turn to page 137)

CAPTIONS FOR PICTURES ON OPPOSITE PAGE

THE CORROSION TESTING PROJECT AT KURE BEACH

1. Pure ocean water, uncontaminated by industrial or other waste, breaks in waves against the protective bulkhead and into the marine basin, where its constant movement is increased by the rise and fall of the tide.

2. The project now covers about 10 acres, including the marine basin and testing building, spray racks, field laboratory, and atmospheric test lot.

3 and 4. The atmospheric lot contains more than 20,000 specimens alternately exposed to rain, sea air, and broiling sunlight, but is beyond the direct effect of sea spray.

5, 6, and 7. Conditions in the atmospheric lot are not only duplicated at the spray racks but are made increasingly severe by frequent drenching with salt spray. Specimens include more than a thousand items from railroad car springs to Monel transformer tanks and samples of metals, plastics, and protective coatings.

8. Who says hair won't grow on a billiard ball? Well, maybe it won't, but marine growth will in reasonable facsimile of hair. Dr. William F. Clapp, of the William F. Clapp Laboratories, examines the effect of marine fouling on an "8 ball." An internationally recognized authority on marine organisms, Dr. Clapp is in charge of these studies at Kure Beach.


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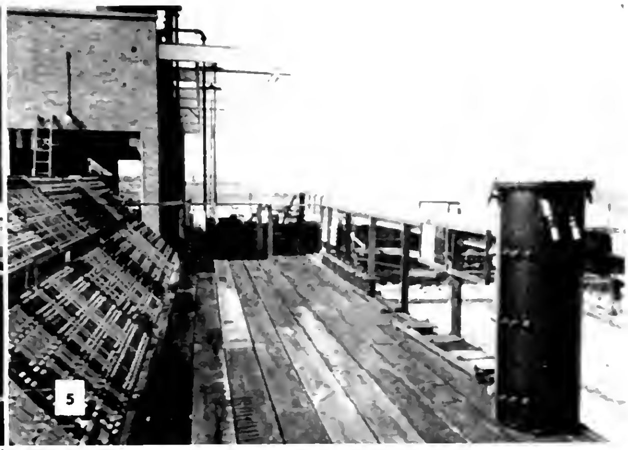
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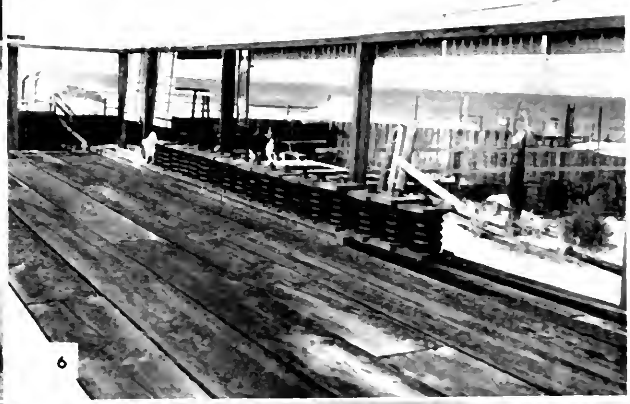
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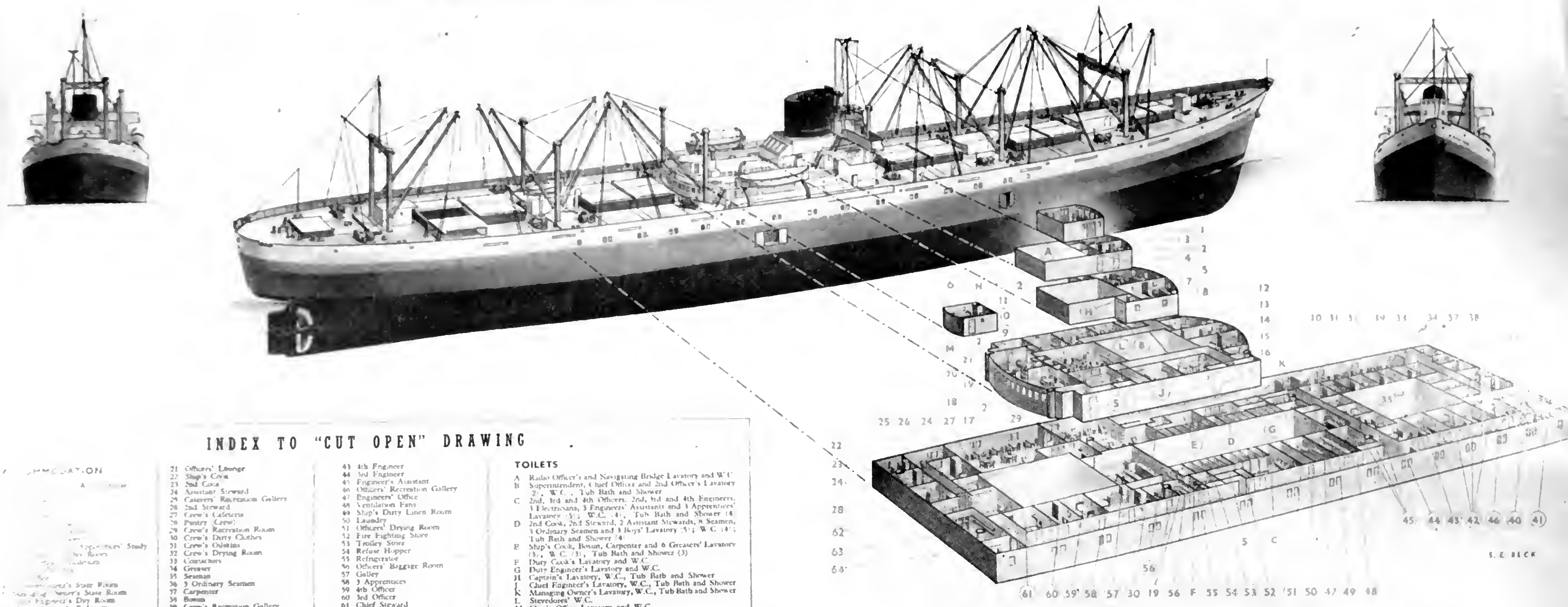
THE "WANSTEAD" CLASS SHOWING THE LAYOUT OF THE ACCOMMODATION



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The three new British cargo ships, *Wanstead, Wendover* and *Woodford* seem to inaugurate a new era in cargo ship accommodations and also in the preparing of design information. These ships are being built for a particular route and the opportunity for so building is an advantage which the British have as a result of their elaborate shipbuilding program. In the American Merchant Marine there are few, if any, big ships, except tankers, which do not carry excessive structural features of one kind or another, and these seriously increase the cost of operation. The American President Lines' round-the-world vessels will have an advantage in this respect, and it is contemplated that the new "prototype," in both cargo and passenger models, will be capable of adaptation to particular services.

M. V. "Wanstead"

Editor's note: Heralded as something new in British shipbuilding, the vessels described in this and next month's issues may indicate a changing theory of ship arrangements. The plans as presented here will merit the attention of both builders and operators.

THE M. V. *Wanstead* is the first of three sister ships built at Caledon Shipbuilding & Engineering Co. Ltd., Shipyard, Dundee, for the Britain Steamship Co. Ltd. for service on the Watts Watts Line between Eastern Canadian ports and Continental ports of Antwerp, Hamburg and Rotterdam. The other two will be *Wendover* and *Woodford.*

This trade is probably one of the most exacting in the world and with the M.V. *Wanstead* and her sister ships an attempt has been made to produce ships which not only take full advantage of the accumulated experience of British shipbuilding but also set forth new ideas and higher standards of crew comfort combined with specialized construction for the North Atlantic trade, which construction includes special strengthening to meet ice conditions and a stability which will not be affected by the deadweight of ice formation on the decks and superstructure; all these points have been borne in mind in the planning of these three vessels.

In order that all cargoes may be loaded and discharged with maximum efficiency, and in the shortest time, special attention has been given in the design to the layout of the hatches, derricks, holds and 'tween decks. These are as shown in the drawing.

In addition, side doors are fitted, two per side as shown in the drawings, suitably dimensioned to permit the efficient and quick stowage of motor cars and package freight.

In the *Wanstead* and her sister ships an attempt has been made to provide officers and men with both comfort and safety. It is rarely in the history of British cargo liner design that a distinguished architect has been consulted regarding designs for interior decoration and layout.

Each adult seafarer, as will be noticed on looking at the cut-open drawing, has his single berth cabin with chest of drawers and bedlight. All cabins for officers and crew are inboard leaving a space 8 feet wide between the cabin and the ship's side, which space forms a long gallery on either side of the ship for the crew's reading, writing and exercise.

Special attention has been devoted to the ventilation, the technique of the coal mine being adopted. Heated or normal air can be admitted into each cabin at the will of the occupant. The exhausted air blows out into the main leeway where it is sucked up by four discharge fans fitted in such a way as to act as the upcast shaft of a coal mine. This will eliminate sweat along the ship's side which causes so much arthritic complaint of merchant seafarers.

Amongst other important features, the galley and the laundry which can cater for the needs of all on board, command attention.

The sanitation is also a rather unusual feature. It, and all the galley discharges have been placed around the engine room casing so that all the plumbing is completely under the control and daily observation of the engine room staff. This in a cold climate should eliminate breakdowns due to the warmth of the top of the engine room casing and should also enable the sanitation to be kept perfectly clean by steam jets.

The keynote of the design is that the ship, when at sea, can be worked in heavy weather without it being necessary for members of the crew to go on deck.

Sliding Hatch Covers

Steel hatch covers of special design as the drawings indicate, slide from the center line in a thwartship direction. In port the winch operators are protected by covered structures.

The mooring arrangements have been specially worked out. The provision of two bullrings, one in the stem and one in the stern, is unusual. Associated with them are two center line bollards to be used for belaying towing hawsers or anchor cable to a buoy when mooring.

There are also two bullrings to port and starboard sides respectively between Nos. 2 and 3 and Nos. 4 and 5 hatches with suitable bollards to facilitate mooring at any berth in the world where the vessel would overhang either forward or aft.

The *Wanstead* and her sister ships are single screw motor cargo liners propelled by a Doxford opposed piston two cycle airless injection oil engine built by Messrs. Scott of Greenock, and the ship has all electric auxiliaries.

Characteristics and Hull Form

The *Wanstead* is one of the most carefully planned cargo liners built since the war for the carriage of general or any homogenous cargo. She is a motorship of 8,300 tons deadweight (as an open shelter decker) on a mean draught of 25 ft., with a depth to shelter deck of 43 ft. 3 ins., and to second deck of 27 ft. 6 ins. The scantlings of the *Wanstead* and her sister ships are such that they will suit a draught of 26 ft. 6 ins. if the shelter deck should be closed.

The height of the accommodation 'tween decks at the side is 7 ft. 9 ins. and the height of the cargo 'tween decks below the accommodation deck is 8 ft. Forward and abaft the accommodation, it varies from 17 ft. 6 ins. to 24 ft. The main deck has no sheer. The 'tween decks throughout are arranged for the carriage of general cargo, the midships lower 'tween deck, i.e. under the

accommodation, being suitable for the carriage of motor cars, for loading of which shell doors have been fitted.

The ship has been built to Class 100A1 "with free-board" with Lloyd's Register. A double bottom is fitted to the hull all fore and aft, divided for the carriage of fuel oil and fresh water as shown. There are no oil tanks in way of cargo spaces except in No. 6 tank which occupies a portion of No. 4 hold. The spaces at the side of the shaft tunnel in No. 4 hold can carry fuel oil, and similar spaces at the sides of No. 5 hold, are arranged for the carriage of water ballast. There is a permanent cross bunker, at the forward end of the machinery space for 310 tons of diesel oil.

Five cargo holds and No. 6 'tween deck are built to carry general cargo and there is a deep tank at the aft end of No. 3 hold. Refrigerator stores are located in the lower 'tween deck below the galley.

In view of the service on which the ship is engaged, ice-strengthening is provided by the fitting of intermediate frames forward for three-fifths of the length.

The hull is divided into cargo spaces, peaks, engine room, etc., by nine steel watertight bulkheads. Large webs are fitted in the 'tween decks immediately above some of the main bulkheads which do not extend to the shelter deck level, so that 'tween deck watertight bulkheads can be fitted at a later date if required.

The shelter deck is the strength deck, and is particularly suited for timber and other deck cargoes. The accommodation "hangs" in an oblong "box" whose width is the total width of the ship in the 'tween decks. The "box" surrounds the engine casing and Nos. 3 and 4 cargo hatches. The accommodation "box" contains all the crew's cabins, cafeteria and recreation room on the port side, various officers' cabins on the starboard side. The galley, laundry, etc., also officers' and crew's lavatories are disposed in the center of the "box." The accommodation opens out into generously disposed fore and aft recreation galleries—starboard side for officers and port side for crew — with natural lighting from oblong windows in the sides of the ship. This gives a striking appearance in profile.

The tank tested hull form is characterized by a raking soft nosed stem and a specially designed stern. There is a patent knuckle line fore and aft, running up parallel with the sheer forward as the bow view in the photograph in this folder well shows.

Special attention has been given to the design of the water ballast and oil fuel arrangements to insure the vessel having an adequate draught when in a light or partly loaded condition.

The fo'c'sle, still considered important in some designs, but very largely redundant except as a store for materials which can conveniently be placed elsewhere, is eliminated, and the result is a graceful clear sweep of shelter (strength) deck with ample sheer forward and graceful sheer aft. The bulwarks extend all fore and aft and there are large freeing ports. The superstructure amidships is short in fore and aft length and is equally curved (rather than streamlined) at the "front" and the "back ends." Neither in length nor in height does the superstructure give any idea of the comprehensive nature of the accommodation and other arrangements in the hanging 'tween decks whose presence as far as the profile is concerned is marked only by the double oblong windows. The superstructure is surmounted by other structures of decreasing length and culminates in a funnel of flat oval appearance which is a working funnel only insofar as the aft end is concerned, being functional at the forward end and supporting the radar scanner.

The derricks are attached to six pair of steel self-supporting guyless derrick posts. Three pair are forward of and three abaft the superstructure on the shelter (strength) deck, and these serve the six hatches, whose steel covers are designed to slide outboard towards the bulwarks, except No. 6 hatch which slides forward, with supports from the deck arranged on the covers. All this insures maximum speed of operation in port. All derricks are of 5 ton capacity except those on the second pair from forward which are 10 ton. To serve them there are twelve 3-ton electric cargo winches, four 5-ton units, and two 5-ton combined cargo and warping winches. Control gear, with the master controller, is so placed that operators have a full view of the hatch and the load, this being one of the few occasions on which such an arrangement has been made in a British ship.

There are six hatches on the shelter deck. Nos. 2, 3 and 4 are 26 ft. wide and 35 ft. long, while No. 1 is 24 ft. 9 ins. long and 18 ft. wide, No. 5 being 35 ft. long and 22 ft. wide. No. 6 hatch right aft is 12 ft. by 10 ft.

The outstanding features of the mooring arrangements are the two bullrings, one in the stem and one in the stern to facilitate mooring and towing leads. Associated with these bullrings are two center line bollards to be used for belaying towing hawsers or anchor cable to a buoy. In addition there are provided on the fo'c'sle head "old man" roller fairleads forward and abaft the windlass to give proper straight leads to the windlass ends or as an alternative to Nos. 2 port and starboard winches.

Two bullrings to port and starboard respectively are also fitted between Nos. 2 and 3 hatches and Nos. 4 and 5 hatches with suitable bollards within close proximity provided to facilitate mooring at any berth in the world where the vessel would overhang a berth either for'ard or aft.

Suitable bollards are further provided on the port and starboard sides of the deck with mooring pipe leads so that barges can be moored safely alongside during loading or discharging operations.

Ship Layout of Officers and Crew Spaces and Galley

As will be gathered from the profile the *Wanstead* and her sister ships are compact above the shelter deck, there being only one short house amidships and that, roughly, extends over the engine room thus leaving a maximum of clear deck space.

As will be gathered from the cut-open drawing which shows the whole of the accommodation in perspective, quarters for officers and crew are disposed amidships over three decks, accommodation for the captain being forward underneath the navigating bridge. The house on the shelter deck contains an owners' suite, accommo-

dation for the chief engineer, chief officer, an officers' lounge and officers' dining room.

The arrangement in the house on the shelter deck is as follows:

At the forward end the owners' suite, which comprises two rooms, occupies space on either side of the center line of the ship, the second officer's cabin being on the port side. The chief officer's quarters comprising a bedroom and a dayroom with adjoining toilet, are aft of the owners' suite on the port side. Abaft this is the ship's office, and abaft this again disposed to port and starboard and on the center line is the officers' lounge, the officers' dining room being at the aft end of the engine casing.

Adjoining the officers' dining saloon on the starboard is a large pantry, with a lift to the galley. The chief engineer is accommodated on the starboard side in similar quarters to the chief officer.

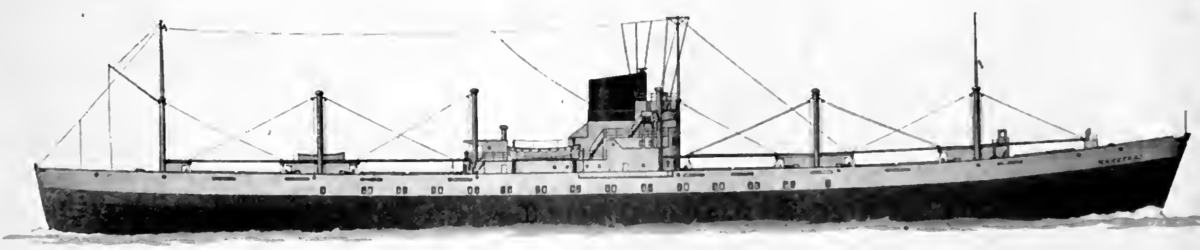
It will be seen from the cut-open drawing that the special accommodation features are to be found in the 'tween deck. The *Wanstead* and her sister ships differ from all other merchant ships afloat in this respect.

The best way to describe this section of the accommodation is to refer to it as a hanging 'tween deck below the shelter deck. It extends from frame 39 to frame 125, and it is characterized by the fore and aft galleries on either side, of which mention has been made in another part of this description. It is unique in that the lavatories, wash places, for officers and crew, the crew's drying room, laundry, dirty linen bins and galley are grouped round the engine casing.

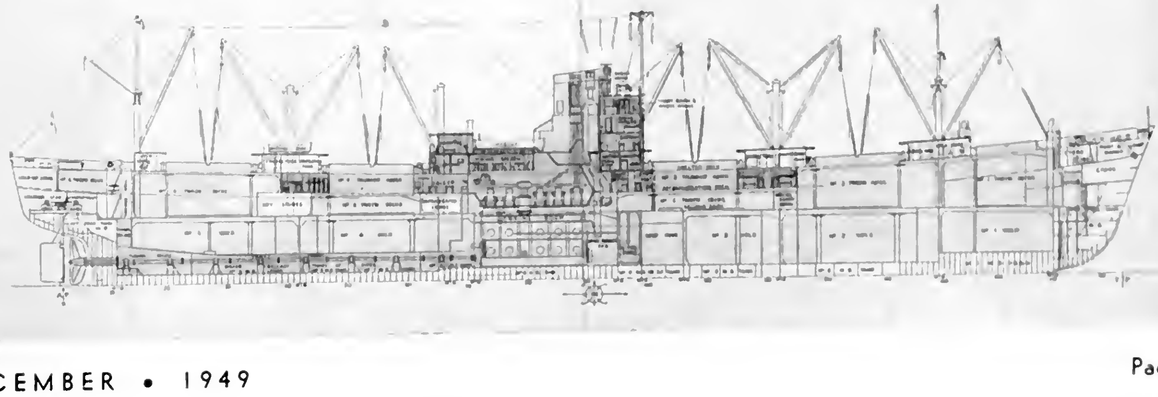
Deck and engineer officers occupy the starboard side, and the crew the port side of the accommodation. There is a block of accommodation around No. 3 trunked cargo hatch; from frame 115 to frame 125, this is occupied by single berth cabins for seamen, and a large three-berth cabin for ordinary seamen, a single berth cabin for the bosun, for the bosun's mate, and on the port side single berth cabins for greasers. As will be clear from the drawings there is a thwartship passageway forward and the fore and aft gallery already mentioned. At the port forward end of this gallery, which can be used for exercise or recreation, there is a series of tables and chairs arranged in Pullman Car fashion: the gallery is then clear aft to frame 73 approximately, where will be found the crew's recreation room. Crew's lavatories and drying room open out into the clear space in the passageway.

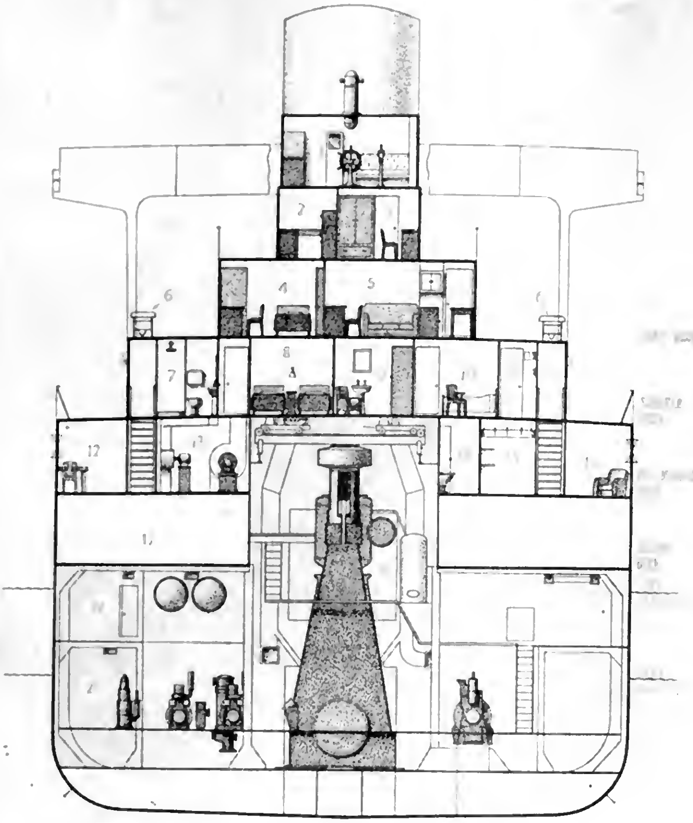
Immediately abaft the crew's recreation room on the port side is the crew's cafeteria with pantry, with special arrangements whereby those on night duty can serve themselves. The *Wanstead* and her two sister ships are among the few merchant ships afloat today under the British Flag in which the cafeteria system of feeding has been adopted. Quarters for the catering department are at the aft end of the hanging 'tween deck on the port side to the center line of the ship and partly on the starboard side. The galley is arranged between the aft end of the engine casing and the forward end of No. 4 trunked hatch in such a way that service is convenient both to the crew's recreation room and cafeteria and to the officers' dining saloon above.

The starboard side with gallery as mentioned is occupied by deck and engineer officers. At the forward end is the second engineer's cabin and dayroom. The door to this dayroom opens out into the starboard fore and aft gallery, the fore part of which has small tables and chairs in Pullman style and is used as the engineers'



OUTSIDE AND INSIDE APPEARANCE OF THE "WANSTEAD" AND HER SISTER-SHIPS





INBOARD CROSS SECTION SHOWING DECK SEGREGATION

(1) Chart room and wheel house.

(2) Radio office.

(3) Radio officer.

(4) Captain's bed room.

(5) Captain's day room.

(6) Exhaust ventilation fans.

(7) Managing owner's lavatory, W.C. tub, bath and shower.

(8) Managing owner.

(9) Superintendent.

(10) 2nd officer.

(11) Officers' oil skins.

(12) Officers' recreation gallery.

(13) Ventilation fans.

(14) Duty engineer's lavatory and W.C.

(15) Crew's Drying room.

(16) Crew's recreation gallery.

(17) 'Tween deck cargo space.

(18) Engine room.

(19) Engineer's store.

(20) CO_2 bottles.

(21) Engineers' workshop.

(22) Space for refrigerating machinery.

recreation space, the cabins for the chief electrician, two electricians, the fourth and third engineers, also opening out into this space. Cabins for the engineer assistants are at the aft end of No. 3 trunked cargo hatch to port and starboard respectively of the fore and aft center line.

Further aft from the portion of the gallery devoted to the engineers' recreation room there is a laundry and dirty linen room, an officers' drying room, officers' lavatory and further aft still a cabin for the appentices, and then the cabins for fourth and third deck officers and for the chief steward. At the extreme aft end and opening out into the gallery is the chief steward's office and the weekly issue store.

It is clear that much thought has gone into the planning of this arrangement and it will be seen on observation that every department of the ship has its own section of the accommodation which can be closed off from other portions.

Adequate light is admitted to the fore and aft galleries by means of windows in the shell, with brass frames. The windows are fixed and have hinged deadlights, the square windows in the 'tween decks of the *Wanstead* and her sister ships give them in addition to their striking profile an unusual appearance.

While this design is not the first in which all accommodation has been arranged amidships, it is the first in which deck officers, engineer officers and crew have been placed in one structure and on one deck round the engine casing and in between the trunked hatches. Quarters are provided for a total of 8 seamen and 6 greasers in separate single berth cabins with iron beds having spring mattreses with a mirror, chest of drawers, wardrobe, bookshelf and hardwood chair; there is an electric reading light at the head of each berth. There is also space for a total of 22 deck officers and seamen, including the captain, 16 engine room personnel, 10 catering staff, 2 managing owners and superintendent.

The gallery is fitted on the unit system with two separate electric cooking ovens capable of cooking for 50 persons, one oven being used as a bake oven when required.

The cafeteria seats 26 persons at a time and has special seats and small tables.

Cleanliness throughout the accommodation is insured by the use of modern plastic fireproof bulkheading: a homely touch is provided by the special "pin-up" pictures of home scenes and of stills from popular films. These are slipped in frames and can be changed as required at the end of each voyage.

(This article will be continued in January, with details of machinery arrangement.)

Coast Commercial Craft

"Sun Beam"— Nordberg and Todd in Tuna Clipper Field

Todd Shipyards Corporation, Los Angeles Division, has completed general repairs and the installation of a new main engine on the purse seiner *Sun Beam*, owned by Captain Mike Elich and the Sun Harbor Packing Company of San Diego. The *Sun Beam* was built in 1948 on the Pacific Coast. She is 101 feet overall in length, with a beam of 26½ feet, and 195 gross tons. The vessel has eight tanks with 150-ton maximum catch capacity. She can remain away from port with provisions for a crew of 12 persons, and full fuel capacity with normal consumption, for 40 days continuous running or 90 days intermittent running. Farthest she has traveled from her home port of San Diego is to the Galapagos Islands. Equipped with an ammonia brine system for refrigeration, the *Sun Beam* also carries an echo sounder, a Fathometer, ship-to-shore radiotelephone, and direction finder.

The Nordberg Power Plant in the "Sun Beam"

Six hundred Horsepower—thirty thousand pounds is the new main engine of the *Sun Beam*. Nordberg's Type FMD-98-RSC engine represents a new approach to the powering of Seiners and Clippers of the West Coast fishing fleet—more power with less space and weight—low propeller speed—low fuel consumption—and above all, dependable continuous performance, are the features of this new engine, the first of its type to be seen on the Pacific Coast.

A conventional four cycle, turbocharged, direct reversing unit, the engine has 8 cylinders, 9" bore, 11½" stroke, and is rated 600 HP at 680 RPM. To produce the desirable low propeller speed of 270 RPM, a heavy duty 2½ to 1 vertical offset herringbone reduction gear is built into the engine and made a part of its base. A thrust bearing of the Timken Roller type is built into the reduction gear, and connection between the crank shaft and the gear is made through a Thomas positive torque type flexible coupling.

The engine is fitted with attached circulating water pumps of the centrifugal type for raw and fresh water; twin lubricating oil pumps of the gear type serve the dry sump lubricating oil system; and an attached fuel booster pump supplies fuel to the injector system under pressure. A particular feature of the auxiliary drive, not usually

Bow view of the "Sun Beam" on trial run. Profile view on page 95.

found on small engines, is the separate gear drive on the forward end of the engine for the auxiliaries remote from the main camshaft gear drive located at the flywheel end of the engine.

Reversing is by means of air ram with suitable interlocks arranged for engine room or pilot house control. A desirable feature of lifting the cam rollers clear of the cams during reversal avoids excessive wear and maintenance of cams and rollers without in any way slowing up the maneuvering of the engine. To provide slow, medium or high speed starting at the command of the operator, a special fuel control system is provided by operation through the main governor to accomplish this purpose.

The Nordberg Type FS-9 and FS-13 engines of this series are built in a range of horsepowers from 200 to 1200 HP, contain all of the above features, and for smaller seine vessels may be provided with sailing clutch and front power take-off clutch where the main engine is used to furnish auxiliary power for the vessel. All of the engines may be furnished as direct drive units or gear drive units with gear ratios of 2 and 2.5:1. In-line gears are furnished for the 2:1 ratio while vertical offset gears are furnished for 2.5:1 ratio.

The new four cycle engines being offered by Nordberg are a design developed since the war, based on knowledge and experience gained with engines of higher RPM and the use of well, conservatively designed reduction gears. These units provide an opportunity for an owner repowering an existing vessel to double his effective horsepower without sacrifice in space, carrying capacity or trim of his vessel, and for new construction a very definite improvement in the designed characteristics of the vessel can be obtained through the incorporation of engines of this class.

In order to effect the engine installation, the complete superstructure, crew's berths, furniture, piping, electric wiring and a portion of the main deck planking were removed ashore, prior to lifting out the old engine.

After removal of the old engine the existing engine foundation was modified with a full length steel base with fitted chocks and new fuel and fresh water and cooling pipe lines were installed to conform with the new engine requirements.

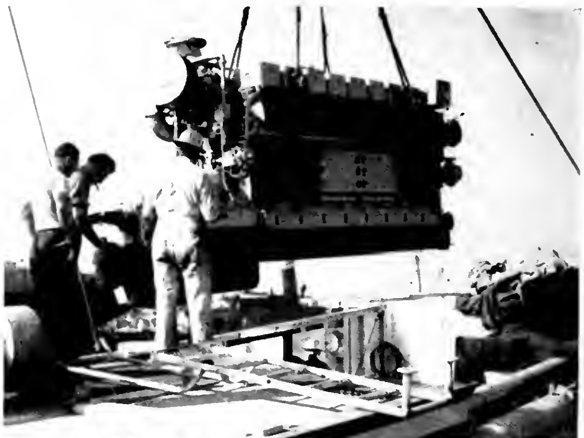
After the new engine was set and aligned, all removals were replaced and painted as original.

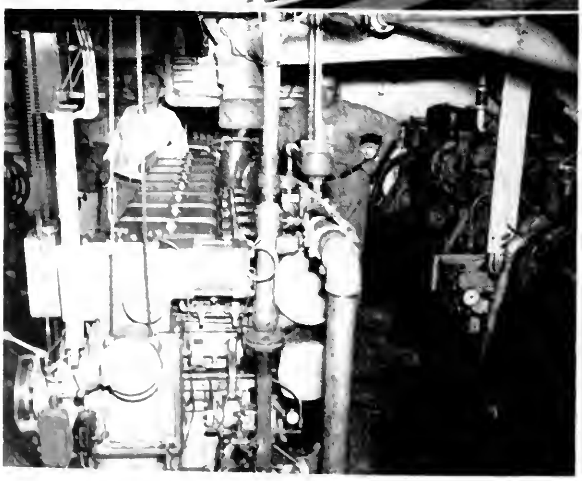
New operation controls were installed with manual stations located inside and outside the pilot house. The electrical alarm system which notifies the ship's personnel of low lube oil pressure on the main engine was modified and tested for the new operating conditions.

A new trolley track, 20 feet in length, was fitted over

Top: The Nordberg engine being lowered into the engine room of the "Sun Beam". Note that the entire superstructure of the vessel has been removed.

Bottom: The engine in place with Chief Engineer E. H. Echerbe (left) and Charles Cox, Pacific Coast Manager for Nordberg.



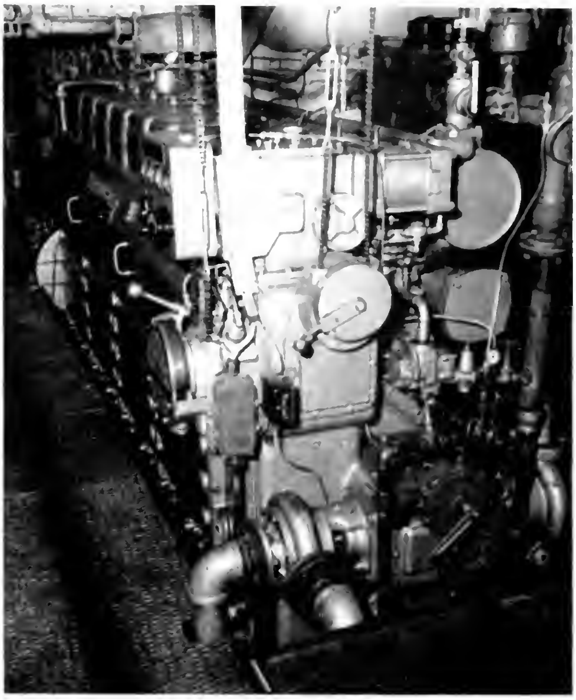


the main engine for lifting and stowing of parts during repair operations.

The *Sun Beam* was drydocked for underwater clean-

Above: The compact Nordberg gauge board in the "Sun Beam."

Right: The finished job. Nordberg engine ready for operation.



ing and painting, examination of the tailshaft and installation of a new propeller.

The new propeller installed is an 82 x 66" Doran, which the engine turns through a $2\frac{1}{2}$ reduction gear at a propeller speed of 270 RPM with engine operation at 680 RPM. At this speed the vessel makes 10.5 knots.

Port Stewards Elect 1950 Officers

New officers were elected for the 1950 term at the October 27th meeting of the Port Stewards' Association of the Pacific Coast, held at the Vista Del Mar Restaurant, San Francisco. The newly elected officers are: Tom Taylor, president; Allen Bissell, vice president; G. Nelson, secretary; Paul Baker, treasurer. The last three men are repeating their office. Executive officers are Eugene Blank, Jack McCartney, Russell Trevillion and Harry Christenson.

Twelve regular members were present at the meeting and two new members, W. E. Borchert, Keystone Shipping Company, and Capt. Oliver A. Ryder, Water Division, Fort Mason.

W. E. Borchert, Keystone Shipping, and Captain Oliver A. Ryder, Water Division, Fort Mason.

Standing, left to right: Frank Cannon, Matson; Paul Babcock, Pacific Transport Lines; Gene Blank, Pope & Talbot; J. McArt, Pacific Far East Line; Al Buckner, State S.S. Co. Seated: H. N. Peterson, Sudden & Christenson.

Standing, Harry Christenson and Russ Trevillion. Seated, newly elected officers for 1950, Tom Taylor, president, and Gilbert Nelson, secretary (for 2nd year).

Diesel Tugs for Venezuela

Three new Diesel-driven tugs have been delivered to the Shell Caribbean Petroleum Company for use in that company's operations in Lake Maracaibo, Venezuela.

These tugs will be used to tow general cargo barges ranging from 100 to 600 tons carrying capacity, oil carrying barges up to 800 tons, floating cranes, drilling barges, dredger, and other miscellaneous floating equipment in Lake Maracaibo up to distances as far as 120 kilometers from base. In addition, they will be called on to make occasional towing trips to the neighboring islands of Aruba and Curacao.

Lake Maracaibo has a tidal outlet to the sea and is approximately 120 miles long by 60 miles at widest part. It is subject to sudden storms with strong winds, so that boats serving the industry must be extremely powerful and seaworthy, and Diesel-powered tugs were decided upon.

Orders for the three new tugs were placed early this year. The first of these craft, the *Onoto,* was delivered to her owners on April 30; the *Burede,* the second tug, was delivered May 31; and the *Pemeno* was accepted by Shell on June 30 and arrived in Maracaibo on July 11. All three tugs were built by the Gulfport Shipbuilding & Dry Dock Corporation of Port Arthur, Texas, and made the trip through the Gulf of Mexico to Venezuela under their own power.

Each of the tugs has the following dimensions:

Length, O.A.	102′ 2″
Beam, M.D.	24′ 0″
Depth, M.D.	12′ 4″
Draft, M.D.	10′ 1″

They are of welded steel construction to American Bureau of Shipping Classification, and were built under the supervision of J. T. Bothoff, representing the owners at the Shipyard.

Each tug is powered with a General Motors 12-cylinder, 2-cycle Model 12-278A Diesel engine, rated 1,200 b. hp. at 750 r.p.m. and driving the propeller through a reverse-reduction gear unit. This engine and the higher-powered Model 16-278A unit are installed in hundreds of sea-going and inland waterways towing vessels and are highly regarded by their owners as exceptionally reliable and economical power producers. Auxiliary power in each tug is supplied by two General Motors Model 3-71 30-kw. Diesel generator sets.

Main propulsion power for the three tugs for the Shell Caribbean Petroleum Company is supplied by a General Motors 12-cylinder, 2-cycle Model 12-278A Diesel engine, rated 1,200 b.hp. at 750 r.p.m.

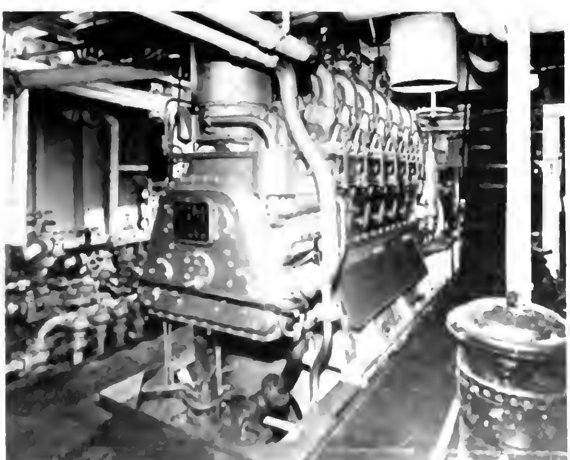


Photo of the "Burede" during her trial runs. This is one of the three tugs delivered to the Shell Caribbean Petroleum Company for use in that company's operations in Lake Maracaibo, Venezuela. The tugs were built by the Gulfport Shipbuilding & Dry Dock Corporation of Port Arthur, Texas.

The main propulsion engine is fully controlled from the pilot house and the after end of the boat deck through electric control of the air valves to the airflex clutch. A new fool-proof automatic timing device makes it impossible to inflate the astern clutch before the ahead clutch is deflated and vice-versa. On trials, the *Onoto* made a speed of 11.6 knots with engine turning 750 r.p.m. and the 8′ 6″ x 5′ 6″ three-blade propeller turning 212 r.p.m.

A new feature of the vessels is the 400 g.p.m. fire pump driven through the airflex clutch and reduction gear from the forward end of the starboard 30 kw. Diesel generator set. This fire pump furnished water at 145 pounds pressure to fire-hose connections port and starboard on the boat deck and main deck and to the fire monitor on the wheel house. The hose connections and monitor can also be fed through a complete dual-foam proportioning tank.

Owing to the large crew necessary for operation in South America, each vessel has accommodations for twenty people (including one engineer apprentice) with combined galley and mess. Galley equipment includes a 20 cu. ft. deep-freeze box and a 20 cu. ft. day box with ice-making trays and cold water faucet.

Deck equipment consists of electric full follow-up steering, 12½ H.P. capstan aft, and anchor windlass forward The 12-person lifeboat on each tug is of the square-stern type, powered with an inboard motor, and built of aluminum, and is also used as a tender when the tug is operated off shallow river mouths, etc.

The tugs are equipped with ship-to-shore radio having adequate range to keep in touch with Maracaibo at all times.

New Fireboat "Port of Oakland"

Converted from a Navy harbor tug, the diesel-electric *Port of Oakland,* first-rank fireboat, with a 10,000 gallons per minute pumping capacity, has been delivered to her operators, the Oakland Fire Department. Claire V. Goodwin, president of the Oakland Board of Port Commissioners, has aptly described the new fireboat as one of the most effective marine fire fighting units on the Pacific Coast. Engineering of the conversion was done by Pacific Coast Engineering Company under the direction of Oakland's Port Manager, Arthur H. Abel and his assistant, J. G. Bastow. D. H. Relfe, mechanical and electrical engineer for the Port of Oakland, was in active charge of the entire job. The work was completed under contract by the Pacific Drydock & Repair Company, Oakland.

The fireboat is berthed at the foot of Broadway in Oakland, immediately adjacent to a fire house from which she can draw her crew of seven hosemen and a Battalion Chief, and have them aboard within a very few minutes. A regularly licensed pilot and a marine engineer continuously man the fireboat. Under this arrangement the *Port of Oakland* can be fully manned and on her way at 14 knots speed almost immediately. Complete two-way radio telephone equipment permits coordinating the fireboat's activities with those of land based equipment and with other fireboats. A special shortwave radio installation keeps her in direct touch with Army, Navy and Coast Guard installations.

The conversion job included the addition of three diesel engine pump units which were mounted above decks aft of the deck house. These three units add 6000 gallons per minute of pumping capacity to the 4000 gallons already available from two electric motor-driven pumps, to give the fireboat the total water capacity of 10,000 gallons per minute, available at a pressure of 150 lbs. per square inch. Seven large monitors and two hose manifolds are fed from the main pressure header which encircles the deck house at the upper deck line. A series of fog nozzles, mounted directly in this header, permit the fireboat to blanket herself in a protective spray when it becomes necessary for her to operate close-in to a fire.

The *Port of Oakland* is powered by two 650 HP, McIntosh & Seymour Diesel Engines through Westinghouse diesel electric drive. Two 515 HP propulsion motors and a common reduction gear turn a single screw at 160 r.p.m. Below decks there are two electric motor driven fire pumps—each with a capacity of 2000 gallons per minute. The switching arrangements are such that the output of either or both main diesel generator units may be utilized for propulsion, or the output of one generator may be fed to the two electric motor driven fire pumps, leaving the other main unit available for maneuvering.

The "Port of Oakland" reaches skyward with all of its nozzles to show its ability in hitting high structures along the waterfront.

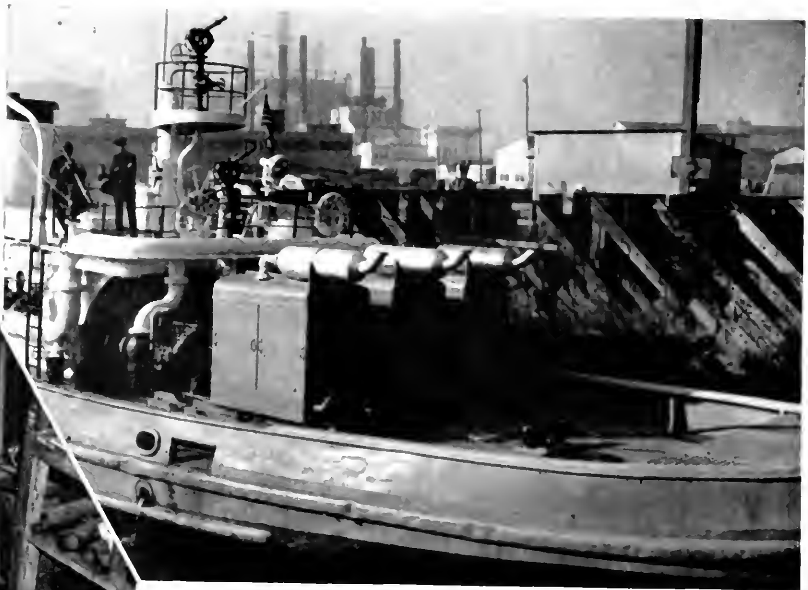
The three diesel engine pumping units were designed and manufactured by King-Knight Company, Engineers, of San Francisco, who are distributors of Buda Engines in Northern California. Each unit is complete with all auxiliary equipment in order to be totally independent of other equipment aboard. The 8 cylinder, supercharged Buda Diesels (Model 8DCS-1125) turn at 1450 r.p.m. to deliver 220 HP to United Iron Works, 6", two-stage, centrifugal pumps. Exhaust gas-operated jet ejectors are used to prime the pumps which are about 8 ft. above the water line. The engines and pumps are mounted together on heavy structural steel beds and are directly coupled together by Fabco flywheel type flexible couplings. Engine cooling is by fresh water circulated through the engine and a Thermxchanger jacket water cooler. Sea water circulation is from Marlowe self-priming, centrifugal pumps, belt driven from the engines. Sheet steel housings having removable side panels protect the engines from the weather. Kittell exhaust silencers are mounted horizontally atop the housings. For emergency power and lighting a 300 ampere-hour Exide storage battery is provided.

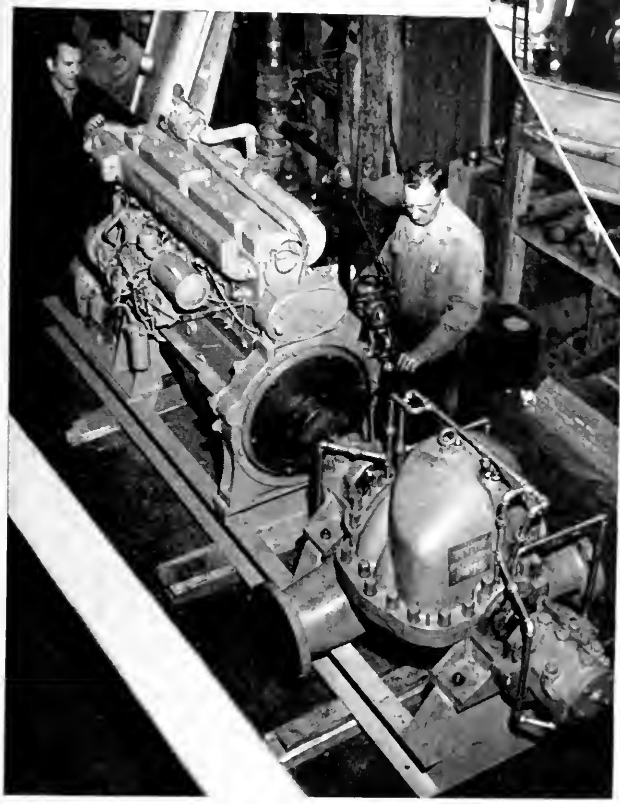
The *Port of Oakland* is 99', 7" long, 25', 6" beam, has

Left, top: The "Port of Oakland" with all nozzles manned ready for initial tests.

Left, center: The fog nozzles which permit near-in approach to a fire.

Left, bottom: 10,000 gallons a minute.





Above: After deck showing part of McIntosh & Seymour main propulsion units which operate through Westinghouse electric drive.

Left: A supercharged Buda diesel for operating King-Knight centrifugal pumps.

a mean draft of 10′, 6″ and a displacement of 276 tons. In addition to the seven main monitors, she also carries aboard 3000 ft. of 2¾″ fire hose, 2000 ft. of 1½″ fire hose, two foam generators and a considerable number of fog nozzles, and other fire fighting equipment. For protection against a fire aboard, both her engine room and motor room are fitted with CO_2 fire fighting equipment.

The new equipment was called into immediate use the following morning when the fireboat was called to accompany the burning Matson freighter *Hawaiian Rancher* up the Oakland estuary to the Encinal Terminal in Alameda and then assist the Alameda fire department in fighting the fire on the listing ship.

Merchant Marine Academy Accredited

The Superintendent of the U. S. Merchant Marine Academy at Kings Point, N. Y., Admiral Gordon McLintock, USMS, has announced that the Academy has been admitted to membership by the Middle States Association of Colleges and Secondary Schools as a result of action taken by the Association's Commission on Institutions of Higher Education. The Merchant Marine Academy at Kings Point thus takes its place among other colleges and universities as a fully accredited institution of higher education and the Superintendent is now empowered by the Congress to confer the degree of Bachelor of Science upon all Cadet-Midshipmen who successfully complete the prescribed course of studies. This is a four year course, with one year at sea, and entitles the graduate to a Commission as Ensign in the U. S. Maritime Service and Commission as Ensign in the U. S. Naval Reserve, in addition to his Merchant Marine License as a Third Officer or Third Assistant Engineer. Now he also earns his Bachelor of Science Degree.

This action of the Association is the result of a careful survey of the Academy at Kings Point in March of this year when the Inspection Party was headed by Dr. Levering Tyson, President of Muhlenberg College, Allentown, Pennsylvania, who is also President of the Association.

Captain William M. Randall, Ph.D., is Academic Dean of the Merchant Marine Academy.

Republic Supply Appointed by Edwards Wire Rope

The E. H. Edwards Company of San Francisco, manufacturer of wire rope, has just announced the appointment of the Republic Supply Co. of California as a distributor. By this move, seventeen new outlets in the central and southern portions of the state were acquired. Stocks will be carried in all Republic field stores as well as in the new $1,250,000 head office and warehouse in the industrial district of Los Angeles.

The Edwards Wire Rope Company was founded in 1916 by Eugene H. Edwards, who had been an agent for an eastern wire rope manufacturer.

The present Republic Supply Co. of California was incorporated in 1919 and a sales office was opened in Los Angeles. Service to the user—supplying what he needed, where he needed it and when he needed it—has been the keynote of Republic's remarkable growth in the years that followed. As soon as oil was discovered, there was Republic. They have operated more than forty supply stores, establishing them almost as soon as the oil strike was made and the need for supplies was evident. Many of their seventeen current stores are as old as the fields they supply. In order to round out their service to the user, Republic established their own manufacturing unit in 1935 to build special machinery to fit the needs of the oil fields.

When western industry began its great expansion in 1941, Republic, after a survey to establish what supplies were necessary, opened its first industrial supply branch in Oakland to serve the San Francisco Bay area.

Warehouse facilities were soon outgrown and a larger plant was purchased in Emeryville, rebuilt to fit their needs, and now serves as the headquarters of Republic's northern California division. The sale of industrial supplies has played an important part in Republic's very fast and healthy growth to a net worth 130 times greater than when it was founded.

Republic Supply Co. of California today represents over 200 manufacturers and has stores in Avenal, Bakersfield, Cuyama, Emeryville, Fresno, Gardenia, Huntington Beach, Long Beach, Los Angeles, Newhall, San Jose, Santa Fe Springs, Santa Maria, Stockton, Taft, Ventura and Wilmington.

With its appointment by Edwards Wire Rope, Republic has added another established product to those it sells to western industry and Edwards has obtained wider distribution. Both the manufacturer and the distributor are of California origin, both examples of the growth of western initiative and energy and both proof of the success that follows making good products and good service available to the user.

Left to right: Dale Russell, Vice President, Republic Supply Co.; Wally Rushing, Los Angeles District Manager, E. H. Edwards Co.; Jack Pike, President, Republic Supply Co.; Roy Johnson, Vice President and General Sales Manager, Republic Supply Co.; Russ Hendrick, General Sales Manager, E. H. Edwards Co.

Large-Scale Naval Reserve Officer Promotions Slated

Promotions for 56,541 inactive Naval Reserve officers are under advisement by selection boards in Washington, but local authorities today warned Bay Area officers that they must confirm permanent Reserve status before they will be considered for new rank.

There are approximately 20,000 inactive Naval Reserve officers living in this area. Only 50 per cent of them have established permanent post-war Naval Reserve rank.

Since all war-time promotions were temporary, officers must acknowledge by oath their highest rank attained in order to be considered eligible for the new promotions.

In San Francisco, permanent status may be confirmed in the Naval Reserve Recruiting office in the Federal Office Building. The telephone number is MArket 1-3828, extension 361.

Under the first large post-war promotion plan, 226 new commanders, 1,815 lieutenant commanders, 16,500 lieutenants, and 38,000 junior grade lieutenants will be named. Promotion lists for commanders and lieutenant commanders already have been received locally.

On the Ways

New Construction — Reconditioning — Repairs

Rubber Covering For "Cleveland's" Shaft

The ticklish job of installing two new 26-ton rubber-coated tailshafts on American President Lines Luxury liner *President Cleveland* was successfully accomplished last week at the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division. Here, the 22,500-ton vessel was drydocked and her original tailshafts removed. Then two spares, which had had a special rubber coating 3/16" thick vulcanized on 31 feet of their 49-foot length, were brought in and hoisted into place as shown here.

Because of the great weight of each shaft, ordinary methods of handling during installation would have endangered the rubber coating. Bethlehem engineers, however, devised a special saddle which clamped tightly around the shaft while it was hoisted into place.

Rubber coating the tailshafts, a large portion of which are exposed to sea water, prevents pitting and corrosion.

Top: The 49-foot port tail shaft shown being readied for installation on the S.S. "President Cleveland." The 31-foot rubber-coated section of the shaft is shown at left, while the special saddle, by means of which the shaft was raised into place, can be seen in the center.

Center: Overhead view, looking forward, showing installation of port tail shaft. The 31-foot rubber-coated section of shaft is shown at left. Special new designed saddle can be seen in the center of the shaft.

Bottom: Overhead view, looking aft, showing installation of port tail shaft. The 31-foot rubber-coated section of the shaft is shown in the foreground.

Todd's Seattle Yard Repairs Cab e Ship

Todd Shipyards Corporation's division at Seattle has completed an extensive overhaul of the colorful, 377 foot, 3179 gross ton, needle-nosed cableship *Restorer,* operated by the Commercial Pacific Cable Company of New York. The *Restorer* is custodian of more than 10,000 miles of telegraph cable lines under the Pacific Ocean. Her home port is at Victoria, British Columbia.

The ship, which resembles a giant swordfish out of water, underwent major repairs to her cable machine, engines and attendant parts. Overhaul of the cable machine was accomplished by the opening of the main deck and the removal of the 30-ton cable machine as a unit to the machine shop, where it was completely dismantled and overhauled, with parts renewed and gear ratio changed.

While the cable machine was out of the ship a new steel deck with heavy fore and aft and thwartship beams was installed to eliminate the vibration encountered when the cable machine was in use.

Another interesting job performed on the vessel while she was at the Todd yard was the sheathing of the No. 2 cable tank. This job necessitated the removal, storage and replacement of nearly 100 miles of deep sea submarine telegraph cable. The No. 2 tank is 33 feet in diameter and 18 feet deep, and was sheather with ⅜-inch steel plate to provide a double wall to eliminate oil leakage from surrounding deep tanks.

Routine voyage repairs also were performed on the *Restorer* at Todd's, including pulling of tailshafts, opening, cleaning and painting of seal valves, scraping and painting the hull and miscellaneous engine room repairs. The annual inspection of two Scotch marine boilers was effected and auxiliary machinery underwent an overhaul.

The *Restorer* was built by the Sir Armstrong Whitworth Co., of New Castle on Tyne, England, in 1902. Her overall length is 377 feet; she has a 44-foot beam, and a draft, loaded, of 23.5 feet. Her sea complement is 82 men. Her cruising speed is 12.5 knots.

Supplementary working boats include a 26-foot diesel launch, a 22-foot buoy boat, a 16-foot dinghy and four lifeboats having a total capacity of 193 persons.

The *Restorer's* cable is stored aboard ship in four cable tanks capable of holding more than 500 miles of deep sea telegraph cable.

Her testing room is equipped with electrical instruments for testing cables and localizing faults. Complete transmitting and receiving equipment is also maintained in the testing room so that communication with terminal stations is available when the cable is onboard during laying or repair operations.

The ship carries a full supply of grapnels, buoys, chains, grappling and buoy rope, and equipment for laying and repairing submarine telegraph cables.

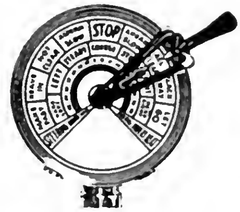
The *Restorer* is primarily operated for maintenance and repairs to her owner's cable system, which provides cable service between San Francisco, Honolulu, Midway, Guam and Manila, and also does charter work for other cable companies operating in the Pacific. The ship has worked in depths of 3200 fathoms. Her deepest job was performed under the Pacific on the Midway-Guam cable in October of 1948 on a cable laid in 1903. The *Restorer,* in working at immense depths, oftentimes brings to the surface strange forms of sea life which only exist miles below the surface of the water.

Captain J. H. Connelly is skipper of this unusual vessel, which has had a lusty career since she was christened more than 46 years ago and which includes service during World War II as a cable ship under the jurisdiction of the U. S. Army Transport Service, Seattle Port of Embarkation.

Cableship "Restorer," owned by Commercial Pacific Cable Company of New York, sails following extensive repairs at the Seattle division of Todd Shipyards Corporation.

Steady as you go!

KNOWLEDGE IS THE STRAIGHT COURSE TO ADVANCEMENT



A Department for Deck Officers

by "The Skipper"

Questions Welcomed. Just Address "The Skipper," Pacific Marine Review, 580 Market St., San Francisco, California

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Use of the Slide Rule By Deck Officers

IN our last article we gave examples of the solution of various formulas and problems which are used in everyday practice by Deck Officers. Space did not allow the inclusion of some problems which are routine practice and of others which are normally not used too often because of the time and labor involved. We plan to try and cover some of these in this issue.

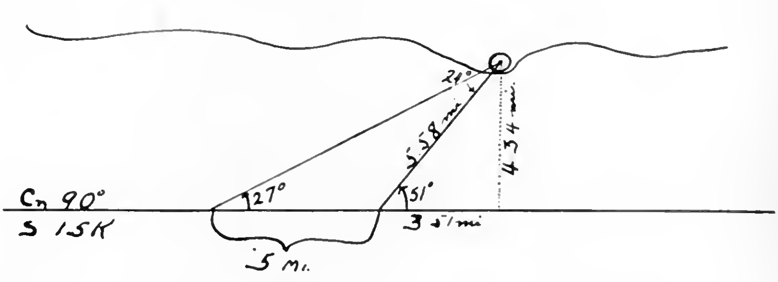
We know that Table 7 of Bowditch is a good and useful table and we also know that it is not used in practice nearly as much as it might be if its use did not require so much laborious computation for interpolation. This same type problem can be solved in less than one minute, while in the wing of the bridge, to an equal degree of accuracy by means of the slide rule.

The ease with which distance off, by means of two bearings on the same object, may be solved makes the Slide Rule a must for the coastwise navigator.

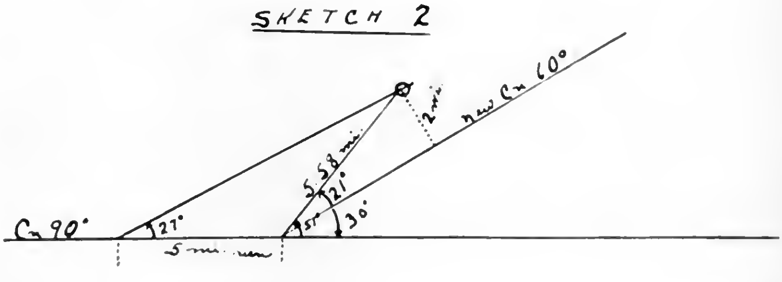
Now let's see how simple the solution of such a problem can be. Using the example as shown in Sketch 1, a vessel on a course of 090° takes a bearing 063° or a relative bearing of 27° on the port bow. Twenty minutes later the same light bears 039° or a relative bearing of 51° on the port bow. In the twenty minutes at a speed of 15 K the vessel has traveled five miles between bearings. Now to solve on the Slide Rule.

First subtract the first relative bearing from the second relative bearing. The remainder (24°) is the value of the angle at the light between the positions of the vessel at the instant she took the bearings. Now back to the law of opposites as explained in a previous article. We

SKETCH 1.



SKETCH 2



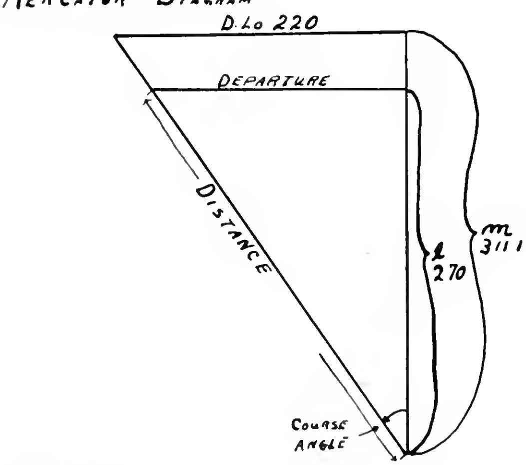
set 24 on the S scale in register with 5 miles on the A scale. Now setting the curser at 27° on the S scale we read 5.58 miles as the side of the triangle opposite 27°, or the distance off at the second bearing.

Now set the right index (or 90°) on the S scale in register with 5.58 on the A scale and move the curser to 51° on the S scale and read 4.34 miles in register on the A scale. This is the length of the side of the triangle opposite 51° (or the distance the vessel will pass off when abeam). Now subtract the second relative bearing (51°) from 90° and find the value of the angle, at the light, between the position the vessel occupied at the second bearing and the position she will occupy when abeam (39°). Move curser to 39° on the S scale and read 3.51 miles in register on A scale. This is the distance she will have to go to bring the light abeam.

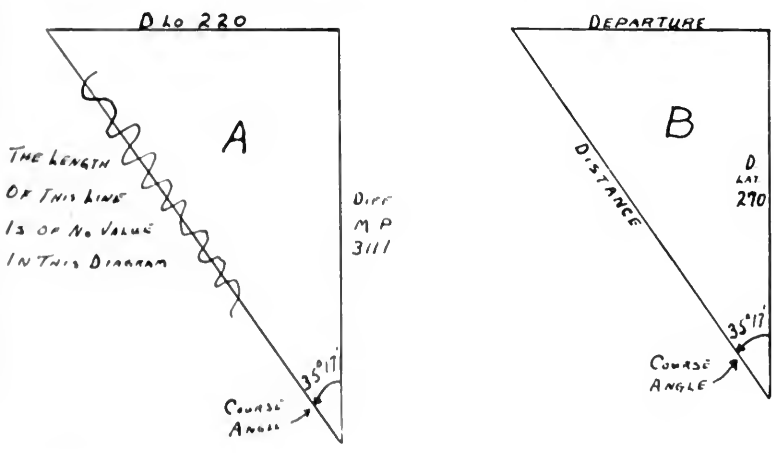
The description of the steps perhaps seems rather lengthy but in reality the time required for the actual operation will be found to be less than one minute after a little practice which is certainly less time than is required in solving the problem by table 7 or by plotting.

Another phase of the same problem which is easily solved is "Finding the change of course necessary to pass a desired distance off when abeam." In other words let us suppose that rather than continuing on the same course and passing 4.34 miles off when abeam it was desirable to pass only 2 miles off when abeam. To find this on the Slide Rule with our slide still in the same position (90° on S scale in register with 5.58 miles on the A scale), we merely move our curser to 2 miles on the A scale and read the required relative bearing of the light (21°) in register on the S scale. Subtracting this value from the second relative bearing (51°), we find the change of course necessary (30°) as illustrated in Sketch 2.

Sketch 3
Mercator Diagram



Now Separating The Diagram For Simplicity We Have



Mercator Sailing on the Slide Rule

To solve Mercator Sailing problems on the slide rule it is perhaps best that we be thoroughly familiar with the Mercator Sailing Diagram as shown in Sketch 3. In reality the Mercator Diagram is two triangles in one with the same proportionate values. That is to say, the difference of longitude is in the same proportion to departure as difference of meridional parts is to difference of latitude. Again to explain this it is better to use an example. Normally in actual practice our mercator sailing problems usually consist of our days run, or of determining the course and distance made good from one noon position until the next. So let us take as an example a vessel enroute from Panama to San Francisco whose noon position on one day was Lat. 28°00′ No., Long. 116° 00′ W. and on the following day the noon position was Lat. 32°30′ N., Long. 119°40′ W. We can set up our problem in this manner:

Lat. 2 —	32° 30′ N.
Lat. 1 —	28° 00′ N.
Diff. of	4° 30′ N.
Lat. or	270′ N.
M.P. 2 —	2051.3
M.P. 1 —	1740.2
Diff. M.P.	311.1
Long. 2 —	119° 40′ W.
Long. 1 —	116° 00′ W.
Diff. Long.	3° 40′ W.
or	220′ W.

Now having established the values of the various sides of our diagram, we can proceed with the solution. First finding the value of the course angle using the values shown as the opposite and adjacent sides of triangle A in Sketch 3: Set T and D indexes of the slide rule in register then read the value on T scale in register with the value of the (opposite side) D.Lo. (220) on D scale (12° 24′). Next set this value on the T scale in register with the value of the (adjacent side) dif-

ference of meridional parts (311.1) on the D scale and read the value of the course angle on the T scale at the D scale index (35° 17′). The answer by logs is 35° 16′.

Note: In cases where the value of the D.Lo. is greater than the value of D.M.P. the procedure is reversed due to the fact that the tangent scale only goes to 45° on the Slide Rule. In such cases the value on the T scale in register with the value of the D.M.P. on the D scale (when the indexes are in register) is set in register with the value of the D.Lo. on the D scale and the complement of the course angle is read on the T scale at the D index.

Now to find the distance made good in our example, we use the A and S scales and go back to the law of opposites again. In using the law of opposites we set the value of an angle on the S scale in register with the value of the side opposite it on the A scale. Looking at Triangle B of Sketch 3, we see that we do not know the value of the side opposite the known angle. However, since this is a right triangle we merely have to subtract the value of the known angle from 90° to get the value of the angle opposite the side labeled D. Lat. (270). Doing this we find this angle to be 54° 43′ so we set this value on the S scale in register with the value of the D. Lat. on the A scale and read the value of the side opposite the 90° angle, on the A scale in register with 90° on the S scale. This is the distance. The answer is 331 miles on the Slide Rule while by logs it is 330.69 miles or a total difference of .31 miles in a day's run. Who of us can say that we navigate to such a degree of accuracy that we cannot tolerate a .3 miles error in such a distance or a 1′ error in the course?

Another type of Mercator problem is that where a vessel's starting position is known and the course and distance run is known and the position arrived at is required. This too can be solved on the Slide Rule with as great an ease but it is not as common because it is not as practicable. The procedure is reversed for this and we start with Triangle B first and using the distance and course as found, we set 90° on the S scale in register with the value of the distance (331) on the A scale. Now subtracting the course angle (35° 17′) from 90° we get 54° 43′. Moving our curser to this value on the S scale we read the value of the D. Lat. in register on the A scale (270). Applying this D. Lat. to the Latitude of our initial position we find the latitude of our point of arrival. With these two latitudes, we find the value of the D.M.P. from table 5 of Bowditch; we then set the complement of the course angle (54° 43′) on the S scale in register with the value of the D.M.P. on the A scale. Then moving our curser to the value of the course angle on the S scale we read the value of the Difference of Longitude on the A scale in register at the curser.

Again space will not permit a further discussion of the many and various other phases of the use of the Slide Rule by Deck Officers. Perhaps at some later date we can continue with these discussions. Try following these directions and practice to gain confidence. Remember practice makes perfect, especially on the Slide Rule.

Ship Fleas May Cause "Food Infection"

By R. P. LONERGAN
Sanitary Engineer
U. S. Public Health Service, San Francisco

Of importance to food sanitation and general health measures on ships are the results of recent experimental studies conducted by the Public Health Service which point to rat fleas—directly or through food contamination — as infective agents. Strengthened preventive measures are indicated in the light of these studies.

Heretofore, it generally had been thought that attacks of diarrhea associated with certain types of food "poisoning" or infections were caused by the eating of food that contained harmful bacteria. It was believed that these bacteria found their way into the foods for the most part through direct contamination by rats or mice or, indirectly, from rats or mice via the hands of a food handler.

However, Public Health Service studies indicate another source of infection—two common species of rat fleas. These fleas, the studies show, may play an important part not only in the spreading of harmful bacteria among rats, but in spreading the bacteria from rat to man. It has been shown that they may be a direct source of food contamination and further, that infection may be contracted directly from the bite of the fleas.

The results of these studies point up anew the public-health value of rodent control measures; for the control of rats means the control of rat fleas. This, in turn, means the control of flea-borne infections—not alone the control of such serious flea-borne diseases as plague and typhus.

It is obvious, then, that thorough-going measures should be taken to eliminate rats aboard ship, and also that no food should be left so exposed that contamination by rats and fleas is possible. To supplement such rodent-control measures as trapping, poisoning, and rat-proofing of ships, a 10% DDT dust may be applied along rat runs in order to kill the rat fleas before they leave the rats. To reduce the likelihood of live fleas leaving the rats after the latter have been killed, it would be wise to carry out the DDT dusting before any trapping or poisoning is begun. This plan also reduces the chance

(Please turn to page 130)

November Meeting Of San Francisco Society

- - With The

At the November 2 dinner meeting of the Society of Port Engineers, San Francisco, Walter B. Hill of C. C. Moore & Co., Babcock & Wilcox, distributors, presented a two-fold program on boilers. The first part was an ably-prepared talk on Steam Atomizing Oil Burners, published herewith. Butch did not get away without having to answer some pointed questions.

The second part of the program was a highly informative color movie on the history, manufacture and functions of steam generators.

Marshall Garlinger did his usual good job of presiding in the absence of the president.

Steam Atomizing Oil Burners

By WALTER B. HILL

USING oil for fuel in boilers is not a particularly old process. It dates back to about 1870 when the burners of vessels plying the Caspian Sea and River Volga began to appreciate its worth and used as fuel the residuum oil found in that vicinity.

However, it was not until around 1900 that oil began to be used extensively in this country. Steam atomization was the earliest successful method of burning fuel oil. However, the inefficiency of the early steam atomizing burners and the successful development of a pressure atomizing burner made the old steam atomizing burners less popular. It was used mainly for burning very heavy oils and residues from cracking processes.

Walter B. Hill, Manager of Marine Sales and Service for C. C. Moore & Co., Agent for Babcock & Wilcox, is shown as he addressed the November meeting of the Society of Port Engineers. He is explaining the Y-Jet steam atomizer for an oil burner. Marshall Garlinger, who presided at the meeting, looks on.

Recently, however, the steam atomizing burner has become more popular. The type of oil which has been sold in recent years known as Bunker C has caused formations of slag on superheater tubes requiring frequent outages and cleanings. The steam atomizing burner has reduced considerably the tendencies for building up this slag.

The large amount of water consumed by the old burners was a disadvantage, some types using up to 10% of the steam generated. The present day steam atomizing burners use less than 1% of the steam generated for atomization. This means that for every 1,000 pounds of steam generated about 7½ pounds is used for atomization.

When you consider the increased efficiency of the boiler due to its cleaner heating surface, this loss of water constitutes a net gain in the amount of fuel required to generate the required amount of steam. Further, the clean fire sides lessen considerably the danger of soot fires in economizers and air heaters. The soot on deck is reduced to a minimum.

For instance, on one ship operating on this coast with steam atomizing burners, the captain wrote the Port Engineer that as far as he was concerned, he had no soot problem on deck. In this same letter, he further stated that due to the wide range of capacity of the burners from the minimum amount of oil which could be burned to the maximum, the steam pressure was held more constant during maneuvering and responses to the engine room telegraph were the best he had ever experienced.

It should be pointed out right here that with the regular straight mechanical atomizing burner, the range of capacity is about 2 to 1. With the so-called wide range plunger type or return flow type burners, the range of capacity is in the neighborhood of 4 to 1. However, with the steam atomizing burners, a capacity range of 10 to 1 or 15 to 1 is easily obtained. This, of course, means that

Port Engineers - -

you are not cutting burners in and out during maneuvering and constant steam pressure can be maintained.

On the ship previously mentioned, they normally maneuver with one burner in each boiler and the oil pressure swings from about 30 psig. to 300.

Steam atomizing burners are entirely suitable for either hand or automatic operation. It is unnecessary for the firemen or the combustion control to adjust the atomizing steam pressure. The firemen or control merely regulate the oil pressure as required and the atomizing oil pressure automatically follows at 20 psi. higher than the oil pressure. This relationship is maintained up to a maximum atomizing steam pressure of 130 psig. At this pressure, the oil pressure is 110 psig. The oil pressure can build up from there to its maximum, normally 300 psig., and the atomizing steam pressure will remain constant at 130 psig.

It should be noted that changing over from a straight mechanical to a Y-jet steam atomizing burner is not a major change as regards cost. If the boilers are equipped with B&W burners, it is necessary to change only the atomizer and the coupling. This can be done in about 15 minutes per burner. It is necessary to add an atomizing steam line which is usually about ¾" IPS. and a differential valve in the atomizing steam line, and re-adjust the automatic combustion control if one is installed. On the Bailey controls no new parts are required. It is necessary only to reset the ratio controller. On Hagan controls it is necessary to install a new cam in the variable ratio regulator. Including the regular atomizers and spare atomizers, a new bracket for disassembling the atomizers and wrenches for this purpose, furnishing and

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Los Angeles-Long Beach Society's Farewell To Frank Boomer

The Los Angeles-Long Beach Port Engineers gave a farewell luncheon in October for Frank Boomer who retired as surveyor from Lloyd's on November 1 to return to Vancouver, his former home. Frank has been in the Los Angeles Harbor area since 1945. He has been replaced by W. J. Bloomfield who was transferred here from the New York area.

An electric ship's bell clock was presented to Frank by Dan Dobler, on behalf of the Society of Port Engineers, as a token of friendship and esteem. The luncheon was attended by eighteen members and one guest.

Top to bottom:

Dan Dobler presiding at the Frank Boomer farewell luncheon. Frank is on his right.

Left, Frank Boomer, with his successor, W. J. Bloomfield.

Ray Jones, standing, and Walter Richards.

Port Engineers at the luncheon.

Marine Safe Practices Afloat and Ashore

Some Factors In Marine Wire Rope Wear

Wire rope plays a vital part in ırgo handling operations aboard ıip. Failure under load can have ɛrious consequences to both men ıd material. Close and frequent ıspection will detect wear and de- ɛcts in time to avoid accidents, but ɛplacement can be an important em of expense. A knowledge of ıe various factors which cause rope ɛterioration may result in con- derable savings through prolong- ıg the useful life of the wire rope ɔoard ship without danger of cident.

Distortion

Kinks and sharp bends leave the ire permanently distorted and eakened. Early failure at the eye a fall is expected and can be oided only through frequent in- ection and renewal of the eye hen necessary. This rapid wear is ıavoidable and necessitates cutting ıt only a few feet of rope. Similar ımage occurs when a guy pendant temporarily led at a sharp angle rough a shackle or padeye. It can ıd should be avoided.

The extent of damage done by ıarp bends is clearly indicated by e fact that most failures of pre- ɛnters occur at a sharp bend re- ırdless of broken wires, abrasion ıd corrosion of other parts of the pe. The bending causes distortion the strands of the rope so that the ıtside strands carry most of the rain. When an eye is spliced ound a thimble, on the other hand, e bend is not so sharp and the rands are held in their normal osition by the curvature of the imble. Hence, the strain is equally stributed among the strands and ires and the strength of the rope not impaired.

Bending Stresses

When a wire rope is bent over a eave or drum, two actions take ace. One is that each wire is bent conform to the curvature. The second is a longitudinal sliding of the wires against each other because the inside arc of the rope against the sheave or drum is shorter than the outside arc of the rope away from the drum. The smaller the diameter of the sheave or drum, the greater will be the sliding and bending.

The recommended diameter of sheaves or drums for 6 x 19 wire rope is 45 times the rope size and the minimum diameter 30 times the rope size. This latter means that for a 5/8″ wire the sheave diameter should be at least 18¾″ while for a ¾″ wire the sheave diameter should be 22½″. While winch drums are usually about 20 inches, and therefore reasonably close to the minimum diameter, sheaves are generally well below the minimum.

Bending a wire first one way and then another, as occurs when the fall winds over the top of the drum and then bends back through the heel block, causes more wear than do two successive bends in the same direction. The fewer bends in either direction the better.

Sheave and drum diameters, and in many cases, the number and direction of bends must be accepted as found. Whenever it is possible to change the size of sheaves upon replacement, increased sizes would be desirable. Advantage should also be taken of any opportunity to wind the underside of the drum when this can be done without changing the direction of movement of the winch controls.

While it is very unlikely that bending stresses are ever the limiting factor in the life of a fall, they do play a part. Lubrication, to enable the individual wires to slide over each other easily is the most practical means of reducing this source of rope wear.

Abrasion

External abrasion is often the chief cause of the deterioration of a fall. It occurs where the fall is dragged against the top or underside of coamings, on improperly lubricated or misaligned blocks, and in the grinding of one turn against another on the drum.

Hatch rollers will reduce the amount of wear that results from the unavoidable dragging of the falls against the coaming. There is, however, a considerable difference of opinion among ship's officers as to whether falls are worn out more rapidly against the coamings or in the grinding on the drum. Since the portions of the fall over which these two sources of abrasion occur do not overlap, it should be simple and profitable to determine whether the one or the other is the greater.

Coaming abrasion can occur only in the forty feet or so near the end of the fall. If it is here that the majority of the falls wear out, hatch rollers would be justified. It would also be practical to reverse the falls end for end before abrasion reached the discard point or to start with a new fall 40 feet longer than necessary and cut off the end when it became badly worn.

Abrasion against sticky sheaves or the cheeks of misaligned blocks can be readily detected on the block itself and can be easily corrected.

Abrasion from friction between the incoming or outgoing fall and the turns already on drum is probably in most cases the limiting factor in the life of a fall. Poor fleet angles are the primary cause of this abrasion.

The fleet angle is that between the line of the fall perpendicular to the axis of the drum from the heel block and the line of the fall from the edge of the drum to the heel block. This angle is therefore determined by the width of the drum and the distance from drum to heel block.

On a smooth drum the rope will wind evenly and with minimum abrasion only when the fleet angle does not exceed 1½°. This represents a distance of 38 feet from drum to heel block for each foot of drum width on either side of the

center line through the sheave. It is at once apparent that the fleet angles on most ships are far in excess of 1½° as it is unusual to have more than 8 or 10 feet between the drum and the heel block for 9 to 12 inches of drum width from centerline of sheave.

The result of these wide fleet angles is that as the full winds from one flange toward the center, the turns do not lie tight against each other but leave more or less wide spaces into which the next layer of turns falls. On the other hand, as the fall winds out from the center toward either flange the incoming fall grinds increasingly heavily against the previous turn. The slack turns which develop as the fall is paid out without a load often produce overriding turns which subject the fall to further grinding and crushing.

These poor winding conditions not only cause excessive wear on the falls but also are frequently the immediate causes of gear failure when the fall suddenly snaps free of an overriding turn and jerks a heavy or tightlined load which is already straining the gear close to its breaking point.

While the fundamental difficulty cannot be corrected except by improving the fleet angle, there are a few steps which may be taken to somewhat minimize the consequences.

When the tension on a wire rope wound on a drum is released the rope tends to twist and throw the first turn either toward or away from the remaining turns. Despite the poor fleet angle, some advantage may be gained by securing the bitter end of the wire to that side of the drum which will cause the outgoing wire to twist toward the adjacent drum. With right lay rope wound over the top of the drum, this will be accomplished by securing the bitter end of the fall to the right hand flange as one looks from the heel block toward the drum. Right lay rope under-wound on the drum would be started at the left hand flange. With left lay rope the start is made at the opposite side.

Keeping the outside of the wire well lubricated will be of some assistance in reducing the abrasion of one part against another. Of course, this grease or oil will at the same time reduce friction between the drum and the wire. If the end is well secured and eight or more turns are left on the drum (which would reduce the strain on the bitter end to about 1/10 the load) there should be no trouble.

In preparation for a heavy load or one which must be tightlined, it would be advantageous, particularly in reducing the chance of shock loads, to rewind the fall smoothly. The use of a running block in the fall in place of putting the winch in low gear would also reduce shock and abrasion of the fall by reducing the tension of the line on the drum.

Corrosion

Aboard ship rust is a very important factor in wire rope life. Rust not only reduces the cross section and hence the strength of the individual wires, but also bends them together. Hence, when a rusty rope is bent the individual wires cannot slide against each other and those on the outside of the bend must take all the strain. Weakened by rust they break easily.

Here again, frequent lubrication is the best available means of prevention. In fact, proper lubrication is probably the most important single means that can be taken by ship's personnel to prolong the useful life of wire rope.

The foregoing information is taken largely from the following excellent booklets on wire rope issued by the sources listed.

References

1. Wire Rope issued by the Wire Rope Institute, 1044 Shoreham Bldg., Dept. 711, Washington 5, D. C. Contains illustrations of and strength and weight tables for many types, sizes and grades of wire rope plus information on fleet angles, sheave diameters, etc.

2. Know Your Ropes issued by the Wickwire Spencer Steel Division of the Colorado Fuel and Iron Corp. Obtainable from local representatives in many cities. A very readable

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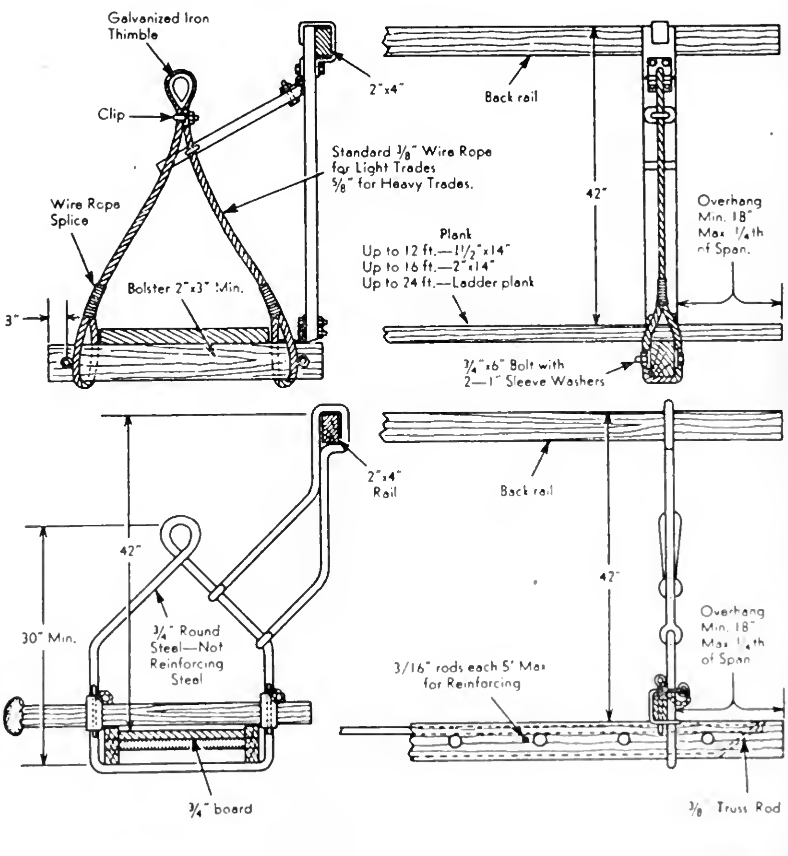
SWING SCAFFOLDS



Pacific WORLD TRADE

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Closing the Dollar Gap —Taxation or Imports?

By RALPH I. STRAUS
Director, R. H. Macy, N. Y.*

DURING the last several months, the lack of balance between our export and our import trade has for the first time come into clear focus as a problem of long standing. For the first three postwar years, our excess of exports to Europe was thought to be largely due to the pent-up demand for goods which could not be provided by war-torn economies. However, it is now recognized as being a symptom of a much more basic and long-term maladjustment. In spite of Western Europe's rapid recovery, it is estimated that in 1952, when the Marshall Plan comes to an end, Europe's imports from the dollar areas will still exceed their exports by $3 billion dollars a year.

To see the picture in its proper context, we must examine the figures of trade going back a good many years. For the last 35 years there has been a dollar gap problem, but only now are its dangerous implications being fully realized. During this 35 year period, from 1914 to 1948, our excess exports amounted to $101 billion. It may be more than coincidental that this averages nearly $3 billion dollars a year, the same as the estimated dollar gap at the end of the Marshall Plan.

How has this export surplus of $101 billion dollars been paid for? Roughly $10.5 billion dollars was covered by private remittances. Another $10.5 billion dollars was accounted for by private capital investment abroad, especially during the 1920's. Foreigners liquidated their holdings of dollar assets and sent us gold to the extent of about $15.5 billion dollars. More than $1 billion dollars was in the form of loans recently made by the International Monetary Fund and the World Bank. The balance, subject to errors and omissions, was made up by the United States Government, $49 billion dollars as grants, and $19 billion dollars as loans, a substantial part of which was long ago in default.

This $68 billion dollars of government financing which covered our export surplus has had two effects on our economy. In the first place, it has operated as a subsidy to American exports and has provided our farms and factories, under present conditions of a world dollar shortage, with larger markets than they could have achieved without Government action. In the second place, these subsidies have increased the American taxpayers burden. Recently we have subsidized our foreign trade as an act of enlightened self-interest during a period of peak prosperity. It is questionable, however, whether we will be willing to continue a policy of subsidies for an indefinite period in the future during a time of high taxes and an unbalanced budget. For domestic political reasons, our immediate concern for the prosperity of American industry and agriculture may out-weigh our concern for world economic stability.

The principal causes for the present dislocation of world trade are not hard to find. Before the second World War, Europe was barely able to balance its external accounts through a system of triangular and multilateral payments. This balance was upset by the war and its aftermath. A large part of European and British investments overseas were liquidated in payment for war supplies, and the warfare at sea temporarily eliminated shipping as a major source of Europe's invisible income. Because of political unrest, and because we have developed synthetic materials, principally for rubber and quinine,

*At the panel on "International Trade" at the American Merchant Marine Conference.

the United States has decreased its purchases of raw materials from the Far East, from which sources Europe used to get dollars through triangular trade. Raw materials and foodstuffs, which Western Europe used to buy from Eastern Europe in exchange for manufactured products, must now be bought from dollar sources. The disappearance of Germany as an important element in the European economic picture has aggravated the situation. In addition, there has been a greater rise in the price of raw materials than in manufactured products, which results in Western Europe having to sell more manufactured goods than previously to buy the same amount of raw materials and foodstuffs.

In attempting to resolve a policy of closing the dollar gap, we must take into account various other factors in addition to those previously mentioned. We should attempt to see that international trade is brought into balance at a high and not a low level of employment. Decreasing international trade results in unemployment and unrest. In addition, we must also safeguard our national policy of persuading other nations to loosen their government controls over trade throughout the world. Foreign governments will surely increase restrictive controls for purposes of self-protection if international trade should shrink to the low levels of the 1930's. Finally, it is essential to our prosperity that we insure an equitable treatment of our exports in world markets.

What To Do?

In light of the foregoing, we can chart four courses of action, or various combinations of them, for the United States to follow in attempting to close the dollar gap.

1. We can continue to subsidize the gap by taxing the American people. This is clearly an undesirable solution as a permanent policy, and is probably one which the American taxpayer will not countenance over a period of time.

2. Our exports can be permitted to drop down to the level of our imports. This process is already taking place, and is a symptom of contracting trade which is the very opposite of what we are trying to accomplish.

3. We can expand our foreign investments. The papers carry a great deal about President Truman's Point Four program, and the necessity of increasing the purchasing power and the standard of living of the undeveloped areas of the world. This is a desirable and intelligent program, but at best it is long range, and will have to depend to a great extent on private, as opposed to Government investments abroad if it is not to impose an additional burden on our taxpayers. Such an expansion of private investments overseas is handicapped by present unsettled conditions throughout the world, so that at best this Point Four program can only be counted on to cover a part of the dollar deficit, and that only over a long period of time.

4. The fourth method of closing the dollar gap would be to increase our imports of goods and services until they were equal to our exports. This is not a question of an obligation on our part to buy from other countries except as a matter of plain good business. Short as they are of dollars, we can't expect foreign countries to buy from us without our buying from them in return, unless we are planning to make up the difference between our sales and purchases out of the taxpayers pocket. More imports mean more paid-up exports.

Of the above four possible courses of action we should adopt two: We should make our biggest contribution to closing the dollar gap by increasing our imports, while the remainder should be made up through an expansion of our foreign investments.

The question may well be asked whether we can profitably absorb a large increase of imports. The answer would appear to be that we can. In 1948 our purchases from the ERP countries amounted to about $3,-167,000,000—or 1.2 per cent of our gross national product for that year. If we had imported at the same ratio in 1948 as we had before the war, the ERP countries would have sold us more than $5,100,000,000—or about $2 billion dollars more than they did, an amount which would go a substantial way to closing the dollar gap. It is reasonable to assume that this prewar percentage of our imports from the ERP countries could have been maintained had it not been for the deterrents to such an import volume which arose as a result of postwar adjustments. But over and above this amount, the ratio of imports to our gross national product could be substantially raised if a number of the artificial obstacles to trade which existed before the war, and which still exist, could be removed, and if the Europeans would develop marketing techniques and trade practices more suitable to our markets.

We might be able to expand our European trade in three different fields.

1. European travel by United States residents leaves dollars abroad, and at the present time it is the largest source of dollar income for European nations. With the enormous increase of purchasing power and wealth in the United States since the war, it is reasonable to assume that foreign travel by Americans will expand even more. In this field, of course, the shipping companies have a particular interest and a special responsibility. Many more American citizens would go abroad if they could get steamship accommodations at low rates. We have seen what "Coach Service" has done to passenger traffic on the airlines. Could not the steamship companies provide more limited-service facilities at lower costs, which would both increase foreign travel and bring additional revenue into their coffers?

2. The second area in which we could increase imports is by bringing in raw materials. We are in need of expanding our purchases for stockpiling strategic materials which either do not exist in this country or which exist only in limited quantities. In addition, as a result of the enormous drain on our natural resources during the war, the supply of many of our raw materials, which at one time seemed inexhaustible, is now coming to an end. A recent publication of the National Association of Manufacturers, called "The Foreign Trade Gap", quoting the final report on Foreign Aid by the House Select Committee on Foreign Aid, lists the following years of commercial supply of certain major minerals in the United States, assuming a rate of extraction at the 1935-39 annual level, and the remaining years supply as of 1944: Chromite 1 year; Asbestos 3 years; Antimony 4 years; Bauxite (grade A) 9 years; Lead 12 years; and

Zinc 19 years. Although not on the list, it is a fact that we are fast exhausting our chief source of supply of high grade iron ore in the Mesabi Range in Minnesota.

3. The third area for increasing imports is in the field of semi-manufactured and manufactured goods. There are many industries in which the special skill of the European worker and manufacturer can and should produce items which would be readily salable in this country, such as special purpose tools and machinery which are not manufactured over here at all. And of course, European manufacturers are well known for their handicraft articles and for their artistic products which sell readily in this country because they represent different and interesting variations of design and taste.

Europeans Should Sell More Actively Here

Europeans could sell more goods by enlarging the area of their sales efforts. There is a large opportunity for the sale of foreign products throughout the whole of the United States and not only on the Eastern Seaboard. Even before the war, the per capita income for the rest of the country, outside of the Eastern Seaboard, had been rising relatively faster than in the East, and this trend was accentuated during the war and postwar years. Were foreign manufacturers to sell their products throughout the United States and in the same proportions as they have in the East, their sales to the country as a whole would automatically be increased by a large percentage.

But what effect will a significant increase in imports have on our domestic industry and labor?

Throughout most of its history, the United States has been traditionally a protectionist country. Protective duties were thought to be desirable in order to permit our industries to get thoroughly stabilized and to emerge from the infant stage. It was also necessary to protect our wage standards against the very low labor wages that existed in many other countries. In recent years, however, starting with the Hull Trade Agreements which modified the high protectionist Smoot-Hawley Tariff Act of 1930, we have begun to reverse our historic high tariff policy.

Our industries are now far beyond the infant stage. Our industrial know-how, our mechanization and the productivity of our labor have far outstripped the rest of the world. During the ten years between 1939 and 1949, of course, the European industrial plant deteriorated or suffered damages, and the working conditions of labor were disrupted, whereas our industry increased its rate of progress. Since the war, with only a brief interruption, this rate of progress has not only continued but has been stepped up.

Many studies have been made of the lower relative productivity in England and in Europe as against the United States. Foreign labor in the countries which could successfully compete with our industries is no longer paid the relatively low wages that prevailed before the war. Social insurance of various types is almost universal throughout European countries, and labor rates have constantly increased in terms of real wages. European industry, therefore, with productivity relatively much lower than ours and with a significant increase in labor costs, should not pose an important threat to our domestic industries.

In spite of our competitive advantages, it can be argued, and quite rightly, that some of our industries and some companiets will be hurt by competition arising from a significant increase in our imports. But fair competition from foreign products is no different from domestic competition, and should be treated as such. Fair competition has always been the life-blood of our free enterprise system. It has served as a spur to lower prices and new techniques of manufacture. Guarded by the operation of our anti-trust laws, it is the foundation of the high level of wealth and productivity which we have achieved.

Increased purchases of imports by the American consumer do not necessarily mean decreased purchases of domestic products. The budget of a great many American families usually is flexible enough to permit the purchases of new and unusual merchandise over and above its basic needs. This statement is borne out by the fact that personal holdings in currency and bank deposits amounted to over $100 billion dollars for the year 1948, according to Federal Reserve estimates. Some of this excess purchasing power could be tapped if the stocks of more of our merchants were sweetened by even a small percentage of different and unusual merchandise from abroad—merchandise peculiar to Europe in style and taste, but acceptable and tempting to the American consumer. Such an increase in imports would mean added sales, profits and employment to the importing wholesaling and retail industries—an increase which otherwise might be lost.

Since an expansion of our import trade seems to offer the best approach to the problem of the dollar gap, let us formulate a program of action for carrying it out. Such a program will depend primarily on the efforts of the foreign exporter, aided and complemented by the American importer. Their combined efforts will not get very far, however, unless some of the artificial governmental barriers that now restrict foreign trade are removed.

European and other governments have already started the process of relaxing their trade barriers by devaluing their currencies for the purpose of making the prices of their products more nearly competitive with prices existing in the American market. This step will be successful to the extent that the inflationary tendencies of devaluation—higher costs of raw materials and higher wages—can be kept in check. Several countries have also recently announced the removal of a few import controls. However, many more impediments to trade will have to be revoked, including such devices as export controls, import quotas, export fees and taxes, and burdensome frontier formalities. Such restrictions have been imposed along with, and as a result of the numerous bilateral trading agreements which have been made by European countries in an endeavor to conserve dollar exchange. Because such agreements frequently pre-empt goods for shipment to other countries, they have lessened the potential volume of goods available to the United States.

In the United States, we will have to revise some of our customs procedures, both by legislation and in administration. It has been estimated by United States importers that if customs procedures were simplified, noncompetitive products in the amount of a billion dollars or more per year could be imported. The last time significant changes were written into the customs administration laws was in 1922, but since that time little

Elliott McAllister Heads Bank of California

Elliott McAllister, one of the country's outstanding authorities on world trade, has been named to the presidency of the Bank of California at San Francisco. This is a happy circumstance, for the Bank of California was one of the first, if not the first, bank in the United States to operate an organized foreign department and was incorporated with the handling of foreign shipping as one of its major purposes, as bills of lading and insurance policies in the files show.

Elliott McAllister is a veteran of World War I, and since graduating from the University of California in 1920, he has been associated with the Bank of California, becoming assistant cashier in 1928 and vice president in 1940. As the head of the foreign department of the Bank, he has written a number of articles for the *Pacific Marine Review,* and made extensive trips to the Orient and to Europe since the war.

McAllister is past president of the University Club of San Francisco and a member of the Pacific Union, Menlo Golf and Country Club, Merchants Exchange Club, Reserve City Bankers Association, and the Bankers Association for Foreign Trade, and in addition to being a director of the Bank of California, is a director of the Red Cross, Remedial Loan Association, West Coast Terminals and Islais Creek Terminals. He is a grand-nephew of the San Francisco pioneer, Hall McAllister, after whom McAllister Street in San Francisco is named.

Elliott McAllister

An interesting sidelight in the history of the Bank of California in this centennial year of Pope & Talbot is the fact that Andrew J. Pope was one of the founding directors of the Bank of California and the Popes have had associations with the Bank ever since. Another interesting sidelight is that the Bank of California's building and that of the Fireman's Fund Insurance Company across California Street were designed by the same architect to exemplify the gateway to the financial district of the city.

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has been done about modernizing the administrative procedures of the Bureau of Customs.

A few illustrations can be quoted to show the difficulties which importers face at the present time. The definition of "value" on which duties are based is unusually tricky. As laid down in the law of 1930, a customs inspector must use the higher of two figures, either "foreign value" or "export value". "Foreign value" is the price at which an item is freely offered for consumption in the country of origin, and "export value" is the price at which the item is freely offered for export to the United States. Many European countries have imposed purchase taxes in order to cut down on home consumption and to encourage manufacturers to sell abroad rather than at home. In some cases, although merchandise is naturally exported at prices which do not include these taxes, they are included in figuring duties at the United States port of entry, and consequently prices have frequently been forced to noncompetitive levels over here.

If a product is sold in an exporting country through a sole agency, foreign value has been declared to be not the wholesaler's price, but the retailer's price, which is naturally much higher. As an example: A manufacturer of floor polishes abroad sold his article to an exclusive wholesaler at \$30.15, who charged the retailer \$38.75, and the consumer's price was \$59.00. American customs decided that due to the fact that there was only one wholesaler, which meant that the article was not being offered for sale in the country of manufacture, the dutiable value was declared to be \$38.75, the price paid by the retailer, and not the \$30.15 paid by the wholesaler.

What Is An Ashtray?

There is often much uncertainty about customs classification and rate of duty which will be charged. For example, an earthenware ashtray can be classified as a household article, with a 15 per cent duty; as a smoking requisite, with a 30 per cent duty; or as luxury earthenware, with a 50 per cent duty. Carpets without fringe are subject to a duty of 25 to 30 per cent; if they have a fringe the duty is 45 per cent. In some cases the classification, and so the duty applicable to an article, may be changed after it has been on sale in the United States for several years. An exporter abroad or an importer in this country cannot find out beforehand which tariff rate will be applicable. The final determination is left up to the customs examiner at the port of entry, with the right of appeal in case his ruling is not thought to be equitable. However, appeal cases delay and increase costs in the handling of a shipment, and frequently a shipment may have to be returned because the opportune time for selling in our markets may have passed.

Our Government should also continue to adjust our tariff rates downward as it has in the past. Under the Hull Trade Agreements program we are continually reducing the average level of our customs barriers, and the recent extension by Congress of the Trade Agreements Act until mid-1951 gives the President power to negotiate additional reductions in return for equivalent concessions by foreign countries. But these reductions do not tell the whole story. A review of the United States Import duties of 1948 reveals that there are still 197 schedules carrying a rate in excess of 40%, many of them applicable to just those specialty types of items on which European countries in particular could do a significantly larger export volume than at present. Some European products are being effectively excluded from this country because prevailing duties would raise the selling price here far above competition—not just even

with competition. Such duties, bearing rates having little relation to present market values, are the ones that must be adjusted in the interests of expanding our import trade.

Even if these artificial barriers on the part of the European and American governments are lowered or done away with, a significant increase in exports from Europe to the United States can take place only through increased sales efforts on the part of European manufacturers and exporters. Foreign representatives will have to come to this country to study our markets and our selling methods. They will have to make personal contacts with the proposed distributors of their products in the same way that our successful export industries make contacts abroad. They will have to familiarize themselves with our requirements and standards in sizes and packaging, in colors and styles. They will have to learn how to maintain inventories and make prompt deliveries, particularly on re-orders. It doesn't do any good to receive toys in January after Santa Claus has gone back to the North Pole. In short, foreign business will have to do as good a job selling in this country as our exporters have done in theirs.

The present dollar gap crisis is a sympton of the long-standing disequilibrium in the terms between the United States and the rest of the world, which has been intensified by the economic upheavals of the war and postwar period. It is a problem which only very recently has come into focus, and in resolving it, we should undertake a complete re-examination of our economic relations with the rest of the world. We are a creditor nation, and so, over a period of time, we should make an effort to liquidate these credits by bringing our imports up to the level of our exports. Our other alternatives are to decrease exports to the level of our imports, or to continue to subsidize the dollar gap for an indefinite period of time into the future. We, the citizens of the United States, will get a better break if in closing the dollar gap, our Government adopts policies that will permit us to spend our hard earned dollars for wanted and useful products, rather than for payment of taxes to Uncle Sam.

Foreign Trade Zone Authorized at San Antonio Airport

Authorization has been granted for the establishment and operation of a Foreign Trade Zone at the Municipal Airport at San Antonio, Texas.

The new Foreign Trade Zone, the sixth of these trading facilities in the U. S., will be the first established in an inland site, the first located at an airport, as well as the first to be established and operated by a private corporation.

Establishment of the San Antonio Foreign Trade Zone will provide new facilities for the expansion of U. S. world trade, particularly with Mexico and other middle American countries.

The Scobey Fireproof Storage Company, the grantee, expects to complete its construction program and open the Trade Zone for business within six months. The facilities will include warehouses, manipulation space, modern cold storage compartments, rooms for fumigation, and offices. Expenditures for the initial construction program are estimated to exceed $250,000.

Foreign merchandise may be brought into Foreign Trade Zones without being subject to import duties or customs bond. Such goods may then be manipulated, processed and combined with other products in various ways. Foreign merchandise brought into U. S. Customs territory from Foreign Trade Zones, however, is subject to all customs requirements, including duties.

Foreign Trade Zones are now in operation at five U. S. major ports of entry. The first of these was established at the Port of New York in 1937. The second began operation at New Orleans in 1947, and the third at San Francisco in 1948. The other two, located at Los Angeles and Seattle, were opened in September of this year.

Big ECA Business for West Coast

114 firms in Northern California negotiated and completed $9,457,000 worth of export business which was financed by the Economic Cooperation Administration during the period January through July, 1949.

ECA started operations in April, 1948 and during the early period of operation there were large quantities of foodstuffs, much of which had been held by the government under various purchase programs, shipped to Europe. The period since January of this year is, therefore, more representative of normal ECA financing. The firms participating in the business, which was negotiated in large measure with private importers abroad, are too numerous to list, but they were large and small. This business covered over 80 different commodities with raw cotton, dried fruit, and petroleum products being most important in that order. Among other products which featured in this business are:

Powdered milk; tires and tubes; diesel engines and accessories; canned pilchards; wheat flour; canned tomatoes, paste and soup; sewing machines; oil burners; canning machinery and parts; domestic heaters; borax; tank gauges and met. tapes; copper magnet wire; inedible tallow; copra; crude sulphur; sisal hemp; lumber; diesel dump trucks; redwood; agricultural power sprayer and parts; electric motors and parts; pencil slats; bean cutting machines; calculating machines and parts; lard; acetylene generators; well drilling and refining equipment; brake lining; milling machines; rice; vegetable seeds; fruit graders and parts; cutoff saws and accessories; typewriters and office machinery and a wide range of chemicals.

The destination of this business was throughout the 18 Marshall Plan countries and some of their colonial possessions. While there were a few large transactions, most of the business was in the small or medium brackets. Firms interested in negotiating business with foreign importers with financing to be supplied by ECA may obtain full information on procedures and names of importers abroad through the Department of Commerce Field Offices. General booklets under the titles "Information for American Businessmen on the Marshall Plan" and "The ECA and Small Business" are available upon request.

Marine Insurance

York-Antwerp Rule Changes

AT a session of the International Maritime Committee held at Amsterdam during September, the York-Antwerp rules on general average were changed, and the delegates of the various countries represented are urging that underwriters accept the changes, the principal of which are as follows:

The following preamble to the rules was adopted:

"In the adjustment of general average the following lettered and numbered rules shall apply to the exclusion of any law and practice inconsistent therewith.

"Except as provided by the numbered rules, general average shall be adjusted according to the lettered rules."

The second sentence of the preamble embodies the clause which has been used by the British Association of Average Adjusters since 1929. Its purpose is to subordinate the lettered rules to the more specific numbered rules. Rule F was amended by adding the words in *italics,* so that it now reads as follows:

"An extra expense incurred in place of another expense which would have been allowable as general average shall be deemed to be general average and so allowed *without regard to the saving, if any, to other interests,* but only up to the amount of the general average expense avoided."

The same new words were also inserted in rule XIV, dealing with repairs; but no such change was made in rule X, which deals with substituted expenses, which remain payable by the several parties to the adventure in proportion to the extraordinary expense saved.

This disposition amounted to a compromise between the somewhat divergent views of different interests involved.

Rule XI was clarified by providing that whenever wages are allowable as general average, they shall include payments of compensation imposed by law or made under the terms of the Articles of Employment.

Rule XIII, which deals with deductions from cost of repairs "new for old," was revised to take care of modern ship construction.

From the point of view of American interests, the principal change was the adoption of the following paragraphs of rule XVI:

"Where goods so damaged are sold and the amount of the damage has not been otherwise agreed, the loss to be made good in general average shall be the difference between the net proceeds of sale and the net sound value at the last day of discharge of the vessel or at the termination of the adventure where this ends at a place other than the original destination."

This substitutes the so-called "Salvage Rule" for the Particular Average Rule which had been adopted in the 1924 revision. The use of the Particular Average Rule had been generally objected to in the United States, and many bills of lading had specifically excluded rule XVI for this reason.

Another rule in which the American view was adopted was rule XXII, dealing with cash deposits. The rule as now amended reads as follows:

"Where cash deposits have been collected in respect of cargo's liability for general average, salvage or special charges, such deposits shall be paid without any delay into a special account in the joint names of a representative nominated on behalf of the shipowner and a representative nominated on behalf of the depositors in a bank to be approved by both.

"The sum so deposited, together with accrued interest, if any, shall be held as security for payment to the parties entitled thereto of the general average, salvage or special charges payable by cargo in respect to which the deposits have been collected. Payments on account or refunds of deposits may be made if certified to in writing by the average adjuster.

"Such deposits and payments or refunds shall be without prejudice to the ultimate liability of the parties.

At the close of the Amsterdam conference, the delega-

tions from Sweden, Norway, The Netherlands, Great Britain and the United States announced that they anticipated that the rules would be generally adopted in their countries and would be incorporated as soon as practicable in the bills of lading of all ships flying the flag of their countries.

Rule XXI was also amended to fix the interest rate on losses made good in general average at 5 per cent instead of the rate prevailing at the final port of destination.

The present revision is particularly gratifying to all those who believe in harmonizing the rule of maritime law throughout the world, because they will eliminate the discord that has arisen since the 1924 revision.

The 1924 rules were incorporated in most of the bills of lading issued by ships flying European flags, but in the United States the lettered rules were generally omitted and rules XVI and XXII were frequently omitted. In England, although the 1924 rules were used, the British adjusters' rule, known as the Makis Agreement and now incorporated in the preamble to the rules, was generally used.

Its effect was to interpret the rules in a manner different from the interpretation adopted by the British courts in the Makis case.

The general adoption of the York-Antwerp Rules 1950 will make it possible for general average adjusters throughout the world to make their adjustments on a uniform basis and should result in eliminating inequalities and unifying and simplifying adjustments in all countries.

General average has formed part of the law of all maritime nations since the days of Rhodes, but the first attempt to harmonize the laws of the various nations in the form of a set of rules was made at Glasgow in 1860, and further efforts were made at York in 1864 and at Antwerp in 1877.

The first successful codification of the rules was adopted at Liverpool in 1890 and out of deference to the prior efforts was known as the York-Antwerp Rules 1890.

These rules were extensively revised and lettered rules added at Stockholm in 1924, and the York-Antwerp Rules 1950 are therefore the third form of the York-Antwerp Rules.

Marine Safe Practices

(Continued from page 111)

"Manual of wire rope selection, application and usage that tells you how to make your wire rope last longer."

3. Wire Engineering issued by John A. Roebling's Sons Co. Obtainable through local representatives in many cities. This is a well illustrated and rather technical set of papers on many factors of wire rope care. It describes in detail a method of determining remaining strength in a wire rope by measuring the amount of wear and counting broken wires.

Marine Safe Practices Pamphlets

Below are listed the titles of all Marine Safe Practices Pamphlets issued to date by the Accident Prevention Bureau of Pacific Maritime Association. Back copies are available.

1 Ship Fumigation—Hydrocyanic Acid Gas.
2 Safety Painting
3 Accident Prevention Organization Aboard Ship
4 Non-Skid Surfaces
5 Care & Use of Oxygen Breathing Apparatus
6 Eye Protection
7 Maintenance & Use of Portable Ladders
8 Construction of Portable Ladders
9 Gas Masks
10 Flame Safety Lamps
11 Gangplanks
12 Accident Investigation
13 The Danger of Low Voltage
14 Basic Accident Causes
15 Overhead Work
16 Strain on Guys. 16 Supplement, Strains on Cargo Gear
17 Grinding Wheels
18 Cleaning Air Compressors and Receivers
19 Safety Belts
20 Portable Fire Extinguishers, Use & Maintenance
21 Oil Absorbents
22 Summary of Seamen's Accidents
23 Galley and Icebox Accidents
24 Safe Working Loads for Various Items of Gear
25 Chemical Hazards
26 Hand Tools
27 Safety Signs
28 Some Factors in Wire Rope Wear

News Flashes

ALEXANDER SHIPS

It is understood that H. F. Alexander has completed the financing for the construction of two coastwise ships for the Pacific Coast Steamship Company and that construction will begin almost immediately at Sun Shipbuilding and Dry Dock Company, the successful bidders.

* * * * *

TRANSPORT "GENERAL MORTON" TO PACIFIC SHIP REPAIR

Pacific Ship Repair Company, San Francisco, has been awarded a second transport conversion, the GENERAL MORTON. The GENERAL MORTON is a C-4. Two additional C-4 transports have been awarded to Commercial Ship Repair, Seattle.

* * * * *

FOREIGN TRADE ZONE AT AIRPORT

The Department of Commerce has authorized the establishment of a foreign trade zone at the municipal airport at San Antonio, Texas.

* * * * *

"PHOPHO" TO MOORE

The 4,300-ton Panamanian steamer PHOPHO is at Moore Dry Dock Company in Oakland for conversion.

* * * * *

LYNCH SHIPBUILDING ACQUIRED BY NATIONAL STEEL

The National Steel and Shipbuilding Corporation, San Diego, has purchased the waterfront lease hold and equipment of Lynch Shipbuilding Company, and the two yards, which adjoin, are in process of being consolidated.

* * * * *

CONSOLIDATED STEEL BUYS SHIPYARD AT ORANGE, TEXAS

The Consolidated Western Steel Corporation, San Francisco, a subsidiary of U. S. Steel, has purchased from the General Service Administration at Washington certain government facilities at Orange, Texas. The Shipyard was constructed by the Navy during the war and formerly operated by Consolidated for the government as a wartime shipyard.

* * * * *

GRIFFITHS TO REPRESENT APL IN SEATTLE

James Griffiths & Sons, Inc., 914 Second Ave., Seattle, has been appointed as American President Line's agent for the Puget Sound region.

* * * * *

DREDGING IN BRAZIL

Brazil has authorized the spending of about $16,000,000 over the next five years for dredging harbors, channels and inland waterways.

BID OPENING DELAYED BY ARMY ENGINEERS

The Army Engineers' invitation for bids on the hopper dredge DONALD A. DAVISON, previously set for December 1st, now calls for bid opening December 22nd. The Army's estimate of the cost is $2,000,000.

* * * * *

JAPANESE PLAN MANY SHIPS

Apparently restrictions are off on shipbuilding in Japan. The Prime Minister announces that the 6,000-ton and 15 knot speed limitation has been removed.

The Government now plans a 68-vessel program for 1950. Twenty-nine of these are 10,000-ton wartime-built vessels now to be rebuilt to meet foreign insurance requirements.

The remaining 39 ships will include eight 12,000-ton tankers, two 7,000-ton tankers, twenty-five 6,000-ton freighters and four 4,000-ton freighters.

It is estimated that the rebuilding job will cost $560,000 per ship.

American shipping interests are violently opposed to this program but if it is to proceed, American vendors should supply the materials. We are already supplying the money.

* * * * *

SHIP CHARTERS

As the date approaches for the turning in of chartered vessels, there is increasing interest in the plans of various owners. About twelve Pacific Ocean operators have ships on charter from the Maritime Commission and will have to surrender them by June 30 unless there is some extension by Congress, and this is not expected except for certain vital routes like Alaska. There are twelve charters in the Alaska service and 45 in intercoastal. A review of this situation will appear in our January issue.

* * * * *

MARITIME COMMISSION SHIPBUILDING PROGRAM

It is reported that the Maritime Commission is shaping up a program for shipbuilding, with President Truman's approval, that will be along the lines specified in the Merchant Marine Act of 1936. This will be before Congress early in the year. Specific companies wanting new ships, in addition to those already announced, will be Moore-McCormack, Farrell Lines and Grace Line.

* * * * *

TRADE WITH JAPAN DEVELOPING RAPIDLY

To handle greatly enlarged trade and trade prospects, the United States is planning to let Japan establish trade representatives in this country. Other nations are being urged by our State Department to take similar action.

The trade representatives will be of a "consular type" but will be under the direct control of the occupation authorities in Japan and will have no actual consular functions.

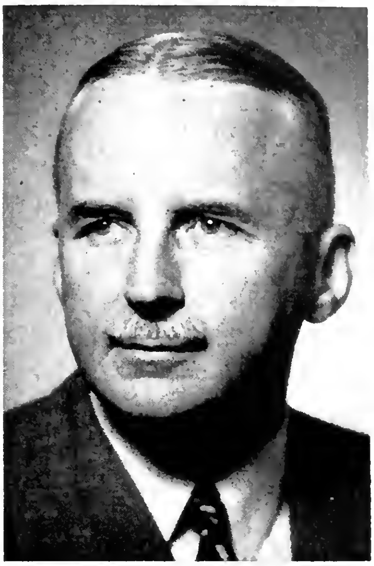
* * * * *

TODD GETS MATSON SHIP

The HAWAIIAN RANCHER, which recently suffered extensive fire damage on San Francisco Bay, has been assigned for repair to Todd Shipyard, Alameda.

Running Lights

Gamble Heads New Standard Oil Subsidiary



M. G. Gamble

The ocean tanker fleet of Standard Oil of New Jersey has been transferred to a new Delaware subsidiary, Esso Shipping Company, which will take over all activities of Standard Oil's (N. J.) Marine Department, including 54 ocean-going tankers of United States registry, aggregating 897,492 tons. This is the biggest fleet of privately-owned ships under the American flag.

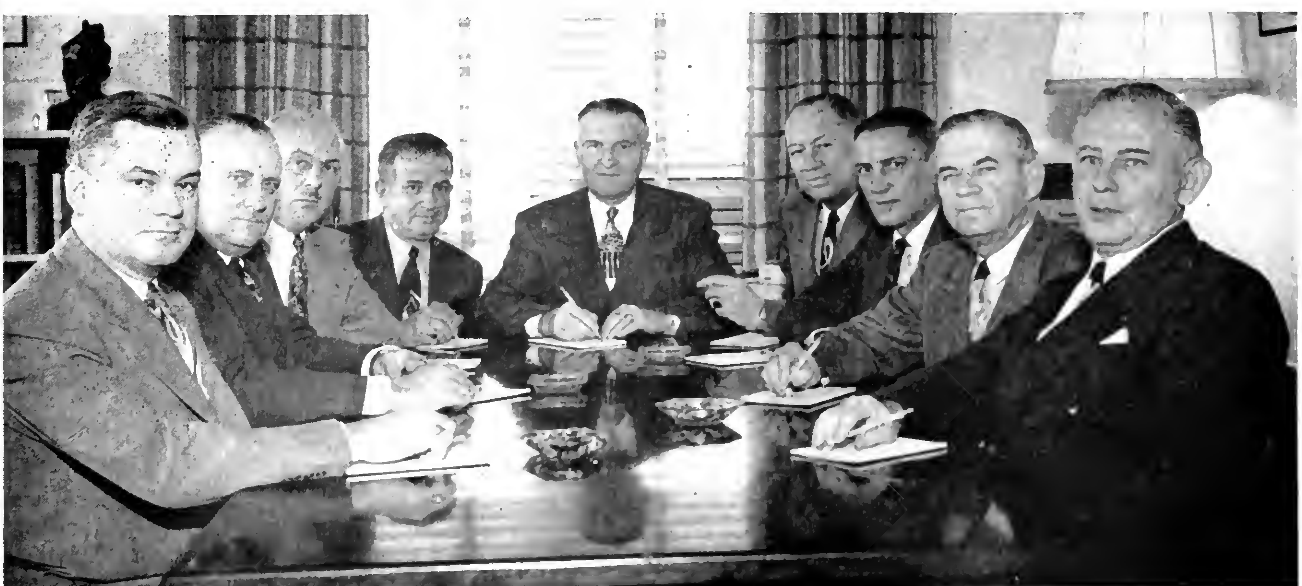
The following officers have been appointed for Esso Shipping Company from the present management of the Marine Department (N. J.): Millard G. Gamble, president; John J. Winterbottom, executive vice president; John D. Rogers, vice president; Clinton DeWitt, treasurer-comptroller; Edmund A. Flotten, secretary.

Gamble will continue to act as co-ordinator of all marine transport, including 61 additional ocean-going tankers totaling 1,030,173 deadweight tons, as well as 83 special service tankers of 258,556 tons, owned by foreign affiliates. He has been manager of Standard's marine department.

Esso Shipping Company's executive offices are at 30 Rockefeller Plaza, and downtown offices are at 115 Broadway, New York City.

Radiomarine Sales Managers and Executives Meet

Radiomarine Corporation of America's Regional Sales Managers and top executives assembled at the home office in New York the last week in October to discuss marketing plans for distribution of Radiomarine's new small radar. Left to right: Harvey R. Butt, Pacific Regional Sales Manager; G. P. Shandy, Great Lakes Regional Sales Manager; George I. Martin, Inland River Regional Sales Manager; George F. Shecklen, Executive Vice President; Thomas P. Wynkoop, President; George P. Aldridge, General Sales Manager; George F. Meacham, North Atlantic Regional Sales Manager; Julius A. Pohl, Gulf Regional Sales Manager; Alex Vadas, South Atlantic Regional Sales Manager.



LUCE AND COMPANY OPEN HOUSE

Guests convene briefly before several rows of prize beef in cold room of Luce and Company on the occasion of their open house in San Francisco. This room, one of four cold rooms, is kept at 34°. Foreground is sawdust, not snow.

A Marine Electric Trio

Snapped in his new association is James McConkey (left, above) with James Murphy and Bill Cathcart, all of Marine Electric Company, San Francisco.

Nordberg Distributor Appointments

Six new distributor appointments for the new Nordberg 4FS-1 Diesel Engine are announced by Harry M. Cahill, Sales Manager, Small Engine Department, Nordberg Manufacturing Co., Milwaukee, Wis.

These appointments are: *Al-Pac Engine & Equipment Co., Seattle, Wash.;* Atlantic Engine Supply, Inc., Boston, Mass.; Bolinders Co., Inc., New York, N. Y.; *H. G. McKinney & Co., Wilmington, Calif.; Northwest Distributors, Ltd., Vancouver, B. C., Canada,* and J. N. Vernam Company, Miami, Fla.

The Nordberg Model 4FS-1 Diesel engine is a single cylinder, 4½" x 5¼", unit rated at 15 HP at 1800 RPM and 10 HP at 1200 RPM. This extra heavy duty vertical type Diesel engine is designed for stationary and portable power generating applications, pumping units, and power units for belt or chain drive or direct connection.

Meat Plant Open House

The modern meat packing house of Luce and Company was host to the Port Stewards' Association of the Pacific Coast and their friends in a plant tour and buffet supper on Nov. 18. Host Ray Luce provided refreshments and entertainment and, as might be expected from one of the finest meat plants on the Coast, a special delicacy in the way of meat. The centerpiece for the buffet was a roast of beef from a U. S. Graded prime steer. Ray procured two such steers and a carload of prize blue ribbon beef purchased at the Grand National Livestock Exposition, to show off for this special occasion, and readily admitted they were the first such beef ever to enter his plant—they are *that* hard to obtain!

The 100-odd guests were given tours of the up-to-date plant in small groups led by Luce personnel. The plant is one of three in San Francisco that provides continuous government inspection of its meat.

(Picture on page 122)

Civil Service Jobs Offered By Navy

Civil service jobs requiring technical training and experience are now available for immediate placement in Guam, the Mare Island overseas employment office has announced.

Greatest need is for criminal investigators with two years college and five years experience.

General science teachers, with pre-medical training, are needed to work in the Guam School of Medical Practicioners.

Also needed are pumpers and guagers with four years oil refinery or fuel farm experience; and accountants with industrial Naval shipyard experience.

These jobs feature six weeks paid vacations a year, income tax exemption, and excellent recreation facilities.

Applicants should contact Overseas Section Employment Office, Tennessee and Wilson Aves., Mare Island Naval Shipyard, Vallejo, California.

If unable to appear in person, application may be made on civil service form 57, and mailed to the above address.

De Laval Pump Catalog

De Laval Steam Turbine Company now has available a new De Laval-Imo pump catalog which shows cut-away drawings of the six different types of De Laval-Imo rotary pumps, along with a brief description of each.

The Imo pump is designed to handle residual and distillate fuel oils, crude oils, all grades of lubricating oils, hydraulic oils, viscous fluids and liquids of similar characteristics. It is particularly well suited to oil burner, pressure lubrication and hydraulic pressure services. Capacities range from 0.5 to 1000 gpm for pressures to 500 psi and capacities to 150 gpm for pressures to 1500 psi.

McAllister Promoted By American Manufacturing Co.

American Manufacturing Company, cordage producers, Brooklyn, announce the promotion of Charles D. McAllister to Sales Manager. McAllister joined the company in 1932

Charles D. McAllister

and has served continuously in the sales division. He was formerly assistant sales manager. During World War II he was with the U. S. Navy in the Aleutian Islands.

Abel Elected President of American Association of Port Authorities

Arthur H. Abel

Arthur H. Abel, Port Manager and Chief Engineer of the Port of Oakland, was elected president of the American Association of Port Authorities at the thirty-eighth annual convention of the North American port body at the Hotel Schroeder, Milwaukee, Wis., on October 15.

Abel, who had served as first vice president of the association during the past year, was elected to succeed H. C. Brockel of Milwaukee, outgoing president. Abel has been with the Port of Oakland continuously since its inception in 1926. He has a national reputation as a port engineer and administrator and is frequently called upon for technical advice.

Martel Wilson New President Of Port Authorities

Martel Wilson, Stockton, Calif. business man and Port Commission chairman, has been elected president of the Pacific Coast Association of Port Authorities. Wilson was vice president, and was chosen president to succeed the late C. S. Sampson of the Los Angeles Board of Port Commissioners.

The coastwide organization Wilson now heads comprises all of the major deep-water ports on the Pacific Coast, from Vancouver, B. C. to San Diego. Its objectives include exchange of information concerning terminal operation and the promotion of offshore merchant shipping through all Pacific Coast ports.

Martel Wilson, new President of Pacific Coast Association of Port Authorities.

Wilson is one of the youngest officers of the Pacific Coast Association of Port Authorities. He is chairman of the Stockton Port Commission, a director and regional vice president of the California State Chamber of Commerce, and vice chairman of its statewide highway committee. He is a former president of the Stockton Chamber of Commerce.

Following graduation from Stanford University and New York University's graduate school of business administration, Wilson engaged in business on the Atlantic coast, but returned to Stockton. He is vice president of the Central Lumber Co. there, and president of Building Material Distributors, Inc., of Stockton, Fresno and San Jose.

Elmer E. Ferrari, director of the Port of Stockton, has been named secretary-treasurer of the coastwide port authorities organization, as the association always chooses president and secretary-treasurer from the same port. Next convention of the group will be held at Lake Tahoe next summer.

Serving with Wilson and Ferrari on the association's executive committee for the coming year are: Col. Warren D. Lamport, manager, Port of Seattle; Robert H. Wylie, manager, Board of State Harbor Commissioners, San Francisco, and E. J. Amar, manager, Long Beach Harbor Department.

Report on Red Lead

"Red lead appears to be outstanding" for enclosed structural members in steel housing construction, according to a recent study by H. A. Pray and R. S. Peoples of the Battelle Memorial Institute for the American Iron and Steel Institute. Some 34 kinds of paint systems were studied during the testing.

Experiments with many well-known and established paint coatings included: (1) continuous immersion in water; (2) contact with air at high humidity; (3) continuous condensation; (4) alternate wet-dry conditions, and (5) continuous contact with insulation in the presence of water. The tests were intended to simulate both severe and moderate conditions of service and "should form a basis for valid comparisons between the effectiveness of the coating systems studied."

As the report stated, "It (red lead) has a good blister rating, it affords excellent protection to the base metal, as evidenced by low weight loss and slight visual evidence of attack on the steel and . . . penetration and undercutting at the damaged zone are either negligible or slight."

The 64-page study of paint systems has been distributed to members of the Iron and Steel Institute as No. 31 of a series entitled "Contributions to the Metallurgy of Steel".

Promoted by APL

John F. Conway, assistant Operating Manager of American President Lines, who will on January 1 succeed W. H. Sharon as Executive Assistant to President George Killion.

The Men Behind Crandall Dry Dock Engineers

Crandall Dry Dock Engineers, Inc., recently put out an illustrated booklet entitled "The Men Behind the Name" which gives a brief biographical description of the men having a major part in the company's operations.

James Lyle Crandall joined his father in 1888 to devote his career to the design and construction of dry docks and allied structures. He was associated in the design and installation of over 230 railway dry docks and floating dry docks in ports throughout the world, and obtained several patents relating to them. From 1893 to 1935 he was chief executive of the firm which later became the Crandall Engineering Company. He severed this connection in 1935 to join his son, J. Stuart Crandall (as did most of his former technical staff) in Crandall Dry Dock Engineers, Inc., acting as vice president and technical consultant until his death in October, 1944.

J. Stuart Crandall

The organizers of Crandall Dry Dock Engineers, Inc., were J. Stuart Crandall, Ray H. Lindgren and Vernon I. Hight.

President and chief engineer of the company is J. Stuart Crandall, the fourth generation of the Crandall family in this field. A graduate in civil engineering from the University of Maine in 1915, he studied soil mechanics and foundation engineering at Massachusetts Institute of Technology in [illegible]. He was associated with his father in the Crandall Engineering Company until 1935 as draftsman, assistant engineer, engineer and executive. His activities have included the installation of over 130 railway dry docks, floating dry docks and other port facilities in the United States and abroad.

Ray H. Lindgren became treasurer and engineer of design for Crandall Dry Dock Engineers, Inc., and was responsible for the design of eight floating docks, over eighty railway dry docks and other projects.

Vice president and senior field engineer for the company is Vernon I. Hight who has been in charge of the construction of over thirty railway dry docks and other structures in the United States, Canada, Belgium, Holland, France and Venezuela.

Others mentioned in the booklet are Jean M. Ducharme, engineer of design; Irving W. Tourtellot, resident engineer on construction, and Paul S. Crandall, fifth generation of the Crandall family, who is a designer and assistant engineer.

Keep Posted

. . . The Life Blood of Industry Is Invention . . .

International Nickel Has Cast Iron That Bends

Industry now has available a new cast iron which, unlike ordinary cast iron is not brittle but can be bent or twisted. This new material can be made readily and economically and can be used in a myriad of applications, affording countless economies throughout the industrial world. It is probably the most outstanding metallurgical development in the foundry industry since 1820 when Seth Boyden first made, from cast iron, the American type of malleable iron at Newark, N. J. The novel product, popularly known as ductile cast iron, has several times greater strength than ordinary cast iron with greatly increased ductility and shock-resistance.

These facts were presented by Don Reese, foundry expert and engineer, before the annual meeting of the Gray Iron Founders' Society, held at Chicago on October 27. The United States Patent Office has recognized the meritorious nature of these inventions by granting Patent Nos. 2,485,760 and 2,485,761 to the International Nickel Company.

This new ductile cast iron combines processing advantages of cast iron, such as fluidity, castability and machinability, with many of the product advantages of steel. The essential feature of the inventions is the introduction into and retention by the molten iron under treatment of a small but effective amount of magnesium. The presence of critical amounts of magnesium in the novel cast iron produces a new graphite structure which is in the form of spheroids or compacted particles. Due to the elimination of a substantial amount of the usual weakening flake graphite, the new magnesium-treated cast iron possesses excellent engineering properties, particularly high tensile strength, elastic modulus, yield strength, toughness and ductility. Under stress, it behaves elastically like steel rather than like cast iron, having proportionality of strain to stress up to high loads with a modulus of elasticity of about 25 million pounds per square inch.

More than forty companies in many industries are now licensed under the patents to produce this new cast iron development. As much

(Please turn to page 138)

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PACIFIC MARINE REVIEW

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ADDRESS ....

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Steam Atomizing Oil Burners

(Continued from page 109)

installing the atomizing steam line, the cost on a ship of the C-3 type should not be more than $3400 to $4000.

The steam atomizer is shown on page 2 of B&W bulletin G-53. It consists of a steam tube inside of an oil tube. The oil first flows through the nozzle, then through a restrictor plate and then into the sprayer plate where the steam is added in five high velocity jets. The resulting flame due to the circular velocity of the air looks like five spokes of a wheel bent backwards. The flame even at low loads has a bare minimum of sparklers and even in a cold boiler is burnt out at the ends.

In designing the sprayer plates for the steam atomizers, full load on the boilers should result in an oil pressure of about 175-200 psig. This allows the load to be varied either up or down without the necessity of cutting burners in or out.

One precaution is to locate the differential valve in the steam line as close as convenient to the burners, particularly when the combustion control is sensitive. This cuts down the volume of the atomizing steam between the regulator and the sprayer plate and eliminates the time necessary for dissipating the steam pressure when the oil pressure decreases. It is also necessary to use judgment in selecting a trap on the atomizing steam line. A half inch bucket type trap has been used successfully as have also some types of thermal traps. The variation in atomizing steam pressure makes the duty on the trap severe so that care should be taken in selecting a trap.

One of the first things which occurs to a marine engineer when speaking of atomizing burners is the water consumption. However, this has been found by experience to be not much of a problem. Most ships have no method of determining actually how much water is used by the steam atomizing burners; however, comparison of the water consumption before and after installation of the burners would justify the statement that on a C-3 type ship water consumption is about three or four tons per day. This is not all a net loss as the steam soot blowers are not blown as frequently, nor are there as many revolutions per blow. On the one ship operating on this coast on which we have records, it was found that blowing tubes once every other day was sufficient. Also, instead of revolving each soot blower up to about six revolutions before the stack was clear, it was found that one or a maximum of two revolutions was sufficient, and even then the stack was a brown haze rather than a black cloud.

Due to the strike, the ship has not been in operation long enough to determine whether it is necessary to blow tubes as often as once every two days. The saving in water from blowing tubes is of course a direct gain and can be deducted from the amount of water used for atomization.

Incidentally, the boilers on this ship are considerably cleaner than they ever were using straight mechanical atomization. In fact, the ships with Y-jet steam atomizing burners are always considerably cleaner.

It is not claimed for the steam atomizing burners that periodic hand lancing is not required but the frequency of the lancings and the amount of soot and slag to be removed are reduced considerably.

From observations of results with steam atomizing burners, there is no question but that they will be found in increasing numbers as time moves on.

Stabilization Reduces Ship's Roll

(Continued from page 81)

through which water is made to flow from one tank to the other—should be placed above a ship's center of gravity. In this position, the force of the water traveling in the duct aids the stabilization process. This means that the duct should be relatively small in order to increase the acceleration force of the water being transferred from one tank to the other. If the duct must be placed below a ship's center of gravity, it should be made as large as possible to minimize the force of the water's acceleration in the duct—a force which in this case is in the opposite direction of the force needed to stabilize the ship.

Stanford engineers, who have been mainly concerned with devising new methods of instrumentation, expect that future experiments with the model will lead to further development of an efficient stabilizer.

Morris, who lives at 812 11th Ave., Redwood City, is a specialist for the Office of Naval Research in San Francisco.

Ship Fleas May Cause "Food Infection"

(Continued from page 107)

of the rat fleas getting on the person who handles the disposal of the rats that are killed.

Another way to add to the effectiveness of these control measures is the residual spraying of all sleeping quarters aboard ship with a 5% DDT spray, which is readily available on the market. Applied as a wet spray to all surfaces in the quarters—including clothes lockers, bunk frames, and mattresses—it will have a killing effect on fleas (and bedbugs as well) lasting for 6 to 9 months after the application.

Where fleas are causing the ship's crew unusual annoyance, clothing — particularly underwear — should be dusted with a 5% or 10% DDT dust. The dust should be rubbed well into the seams of the clothing. One such treatment will often continue to be effective even after a number of washings of the garments. This measure would be a good precautionary step to take if dead rats are found aboard the ship and there is no known reason for their death.

Fairbanks-Morse Announces Changes in Sales Personnel

Several changes in their sales organization have recently been announced by Fairbanks, Morse & Co., Chicago. They are as follows:

J. A. Cuneo, formerly Branch Manager, Los Angeles, has been transferred to Chicago to assume the duties of Manager of the company's Chicago Branch. A. M. McLaren succeeds him as Los Angeles Branch Manager.

John S. King, formerly Manager of the Chicago Branch, has been moved to Cincinnati, Ohio, as Branch House Manager of that sales area. He succeeds J. S. Peterson who has been transferred to Chicago and will be attached to the Sales Manager's Office.

William H. Kingsley, who has for the past twelve years been District Manager of the New York office of the Ideal Electric & Manufacturing Company, has joined the Fairbanks-Morse organization to become Manager of the Electrical Division, with headquarters in the company's executive offices in Chicago.

Kerr Steamship's New Offices

The opening of new offices at Los Angeles, Portland and Seattle, from which its operations at the respective ports will be directed, has been announced by Kerr Steamship Company, Inc., New York. For the past several years the Company's offices have been with the General Steamship Corporation Ltd. at Los Angeles, Portland and Seattle.

The new office at Los Angeles will be at 726 West Sixth Street; at Portland at 421 S.W. Sixth Avenue; and

at Seattle at 821 Second Avenue,—the change being in line with the Kerr Steamship Company's policy of establishing its own offices in strategic trade centers in the United States.

The appointment of John A. Liautaud as Southern District Manager, and Dwight Hill as Northwest District Manager, was also announced.

A More Harbor-Wise Chamber President

With the election of some "harbor-minded" officers of the San Francisco Chamber of Commerce, there is evidence that the port problems will get the attention they deserve from the Chamber. Business interests—and the city government—will be kept better informed of the vital place the port occupies in the city's economy.

Paul A. Bissinger will be the 1950 president, and he announces that the harbor and its shipping "will be the Number One interest of the Chamber." Along with Bissinger as directors will be Gerald A. Dundon, vice president and general manager of Pope & Talbot, and Maitland Pennington, vice president of Pacific Transport Lines. Also represented are foreign trade, banking and

Paul A. Bissinger

marine insurance, and Bissinger himself is a long-time shipper.

Paul Bissinger was born in Portland, Ore., but went to school in San Francisco and at Stanford. War's end found him a Commander in the Navy after service in Sicily, Salerno, Anzio and France. He is vice president of Bissinger & Co., hide and wool concern, and is an officer in many civic and cultural organizations, including the Musical Association, Y.M.C.A., World Affairs Council, and Conference of Christians & Jews. He was president of the Junior Chamber of Commerce in 1935, and is vice president of the San Francisco Chamber of Commerce and chairman of its Military and Naval Affairs Committee at the present time. Immediately after election to his new post he took off for Washington in an effort to protect the San Francisco Naval Shipyard from shutdown.

Hendry Acquires Weule Instrument Agencies

The 97-year-old Louis Weule Company of San Francisco has been dissolved and its entire stock of nautical instruments, including compasses, binnacles, ship's clocks, ship's logs, binoculars, barometers, and chart-room equipment, will be available at C. J. Hendry Company, 27 Main St.

Hendry is also acquiring at San Francisco the sales agencies for navigational charts and publications of the U. S. Coast & Geodetic Survey and the U. S. Hydrographic Office.

This new navigational department will be in charge of Capt. Alfred Lancaster.

The C. J. Hendry Company has had the agencies mentioned above in its San Pedro branch for some time.

Weule Instrument Repair Shop Continues

The Nautical Instrument Repair Department of the Louis Weule Company, San Francisco, has been acquired by Weule's former shop foreman, W. K. Schreiber, and he will operate it as the Louis Weule Instrument Repair Shop at its present address, 119 Steuart St.

Frank Smith and Everybody's Inn

Docking at the Port of Reno has probably been anticipated by few mariners, but we learn from Frank W. Smith that it is a spot which should be on the route of every traveler, especially during vacation.

Frank, whose activities in the Merchant Marine have brought him coastwide and even national notice, has purchased the "Everybody's Inn Motel" at 1756 East 4th St., Reno. Frank lives there himself.

While serving as port engineer at San Francisco for the American Mail Line, Frank Smith, along with Joe Gisler and a number of other leading port engineers, organized the Society of Port Engineers, a venture which has since proved popular in other ports of the country. Frank was the first president and guided the San Francisco Chapter through its early difficulties, and when his term ended he turned it over in prosperous condition to his successor, Phil Thearle.


Frank William Smith

While Frank Smith is known at least as well in the printing trades as in the marine field, there is little doubt that the maritime industry around San Francisco will miss him most.

It is said that the early day "bonifaces" were monks, and that latter day "bonifaces" are jolly inn keepers. Frank qualifies in at least one of these categories.

Hampton Neergaard Opens Office

"Hamp" Neergaard, formerly Marine Superintendent of Burns Steamship Company has opened a new office at 119½ West Anaheim Street in Wilmington, Calif. He specializes in Marine Surveying and Ships Husbandry.

He is representing Burns Steamship Company, American Foreign Steamship Company of New York, J. H.

Winchester Company of New York, Pittson Marine, and North Atlantic and Gulf Steamship Company.

Neergaard has some twenty-seven years experience as Port Engineer, Marine Superintendent and Marine Surveyor in the Los Angeles Harbor area. At the December meeting of the Society of Port Engineers, he was elected President for 1950.

PFEL Announces Promotions

Three promotions in Headquarters Staff of Pacific Far East Line, Inc., were announced November 30, 1949 by Thomas E. Cuffe, President of the Line.

H. G. Tobin has been made General Freight Agent with responsibilities for the direction of all transpacific solicitation in the San Francisco area. Tobin joined the Line in 1947 as District Freight Agent after extensive experience in export and import business as well as steamship organizations.

R. C. Wagner has been appointed District Freight Agent for Mediterranean Service. He is well known to the trade, having been with Interocean Steamship Corporation for ten years prior to his Army service during World War II. He joined Pacific Far East Line in February 1948.

E. A. Wester has been promoted to Manager of Transpacific Services. Wester has been with the Line since its inception in 1946 and was previously associated with

Left to right: E. A. Wester, new manager of transpacific services in the traffic department of Pacific Far East Line, Inc., San Francisco; H. G. Tobin, General Freight Agent; and R. C. Wagner, District Freight Agent for Mediterranean services.

American President Lines prior to his Navy service during World War II.

These promotions, while giving recognition to the individuals involved, were being made primarily with the idea of further improvement of the Company's specialized type of services to shippers for which it has become well known.

Maritime Commission's Program

(Continued from page 84)

taken, both within the Maritime Commission and within the industry.

If the Maritime Commission is to function effectively we must have not only the confidence of industry and labor, we must be able to muster the concentrated power of other Government agencies. To rally that support we shall need a firm declaration of policy. It seems to me this applies particularly to the longer future, a future which might include a downswing in the shipping cycle. In such an event, which will demand some sacrifices from all hands, cooperation would provide our best anchor to windward.

Better Port and Cargo Handling Facilities

We all know that the United States entered World War II with an 11-knot Merchant Marine and came out with virtually a 16-knot fleet. As often happens, this marked improvement in the speed of vessels has served to highlight the need for improvement in the handling of cargo. This is a many-sided problem and it will have to be attacked on several fronts. Though stevedoring is the largest single item in the cost of ship operation, cargo is still being handled pretty much as it was in the days of the clipper ships. While there is probably a surplus of piers for normal peacetime commerce, most of them are unfit for mechanized operations on a scale that meets the tempo of modern transportation needs.

The widespread lag in the development of port facilities—and there are some notable exceptions—is largely the result of divided responsibilities and lack of regulation. Admittedly this is a very tough problem for it involves many factors, local and national, private and public. The Maritime Commission recognizes the need for an overall study which would explore every aspect of the problem. Granted that the difficulties are great, so are the potentialities. Better port and terminal facilities would have tremendous significance for our domestic shipping.

The other phase of cargo handling—on board ship—offers equally interesting possibilities that range from improved hatches and cargo containers to entirely new types of vessels, among them trailer ships. The Maritime Commission has done some research along these lines and we are anxious to do a great deal more. Lack of funds has curtailed our activities in this field and the prospects are no better for the next fiscal year. But in looking further ahead it certainly would seem that this whole subject deserves the most careful attention.

Turning again to matters of policy, let me say a word about discrimination by foreign governments against our shipping. Perhaps some of you will regard it as a negative word on a very complex and touchy matter. In any event, I want to voice my fervent hope that this Nation will not fall into the colossal error of adopting retaliatory legislation against foreign shipping. To do so will inevitably invite retaliation. This chain reaction is as certain as tomorrow's sunrise. It is as dangerous and unpredictable as a hurricane.

Regarding the movements of goods for our armed forces by the newly created Military Sea Transportation Service, the Maritime Commission is working closely with this agency and will continue to do so in the future. The controlling policy here is to assure the flow of ocean cargo required by our military occupation forces. Insofar as privately owned and operated Ameri-

can-flag vessels can provide that assurance, the Maritime Commission favors their use, and we are ready to explore any further possibilities that may be uncovered.

Need I say that the Maritime Commission is dedicated to the principle of a privately owned and privately operated merchant fleet? Within the broader framework of our national security needs, the Commission will do everything in its power to uphold that principle.

And I mean everything—including the exercise of certain regulatory functions which the Congress has assigned to us. Now that my colleagues have escaped from the Sargasso Sea of administrative detail, I believe that we can get much closer to problems involving the tariff schedules of carriers engaged in domestic and non-contiguous transportation as well as the many conference agreements now in effect.

The problem of reviving our domestic shipping structure is indeed a serious one. The home fleet, if I may use that term, displayed its great value in national defense at the start of the last war. Our three long coastlines are natural transportation routes. Their past history and future potentialities make them an essential part of our commercial transportation scheme. As we all know, high operating costs are the great deterrent at this time—and cargo handling represents between 50 and 60 per cent of these costs. Surely this fact reinforces the need for a full-scale inquiry into ways and means of handling cargo more efficiently, ashore and aboard ship.

Charters

A little over two years ago the Maritime Commission had on charter to private steamship operators about 1500 vessels—today the number is less than 225. As you know, the broad purposes of chartering were to meet the greatly expanded volume of our export and import requirements—with particular emphasis on European rehabilitation and the world-wide needs of our armed forces.

With the rapid growth of foreign merchant fleets there has come a continuing decline in the need for our Government to charter vessels. Today many privately owned American ships that had engaged in foreign trade are laid up. Since it has been a policy of the Maritime Commission in all its chartering activites to minimize to the greatest possible extent competition between Government bareboat ships and privately owned and operated vessels, the Commission has just served notice that most of these bareboat charters will be terminated. Dry cargo vessels on berth or liner operations in the foreign trades are the first to be affected. Incidentally, these termination notices do not apply to Commission-owned and chartered combination passenger-cargo vessels.

Since a detailed statement has been sent to all bareboat charterers, I will not go into the matter further, beyond saying that this policy determination has been studied very carefully indeed.

No matter how wisely the Maritime Commission goes about the tasks which I have outlined—and the list is by no means complete—we cannot achieve any real measure of success without much greater public understanding. Today the American people are not "maritime minded." We have largely forgotten a seafaring heritage that underlies our development as a great nation.

President Truman has recognized this situation, which he described in a letter to the Chairman of the Maritime Commission on August 20, 1949. The President said:

"An adequate appreciation of the importance

(Please turn to page 137)

mounted in the base of the motor, and there is no conduit box on the side. The conduit box has been replaced by a built-in terminal board inside the end shield for easier wiring.

In ratings from ½ to 5 hp, these high torque motors are available in two types: Type KCS, capacitor-start, and Type KCR, capacitor-run. These differ only in starting current, not in output characteristics. The Type KCS motor is designed for 115/230 volts, while the Type KCR motor is a single-voltage, 230-volt design. They are suitable for air compressors, commercial refrigeration and air conditioning equipment.

Trouble Light Has Permanent Magnet

The "Henco Magnalume 300" is something different in a "self supporting" trouble light. The Alnico V Magnet, molded right into the case, is a deep-flux type. This means that it holds through thick paint and grease, with an approximate 17-

pound grip. All construction is the finest, with the enclosed switch, 25-foot cord, and Neoprene rubber used throughout to prevent deterioration in oil and grease. More information may be had from the C. J. Hendry Co., 27 Main Street, Dept. AP, San Francisco.

General Electric's New Streamlined Electric Motor

Development of a streamlined general-purpose electric motor, one with improved operating characteristics although about 20 per cent lighter in weight and size over previous models, is announced by the General Electric Company's San Jose factory where the newly-designed motor is now in production for supplying the company's world-wide markets, and where it was designed and engineered.

Of cast iron construction, the motor presents a smooth, streamlined appearance. To minimize over all dimensions, capacitors are

Corrosion Testing Station

(Continued from page 88)

terials for railway car springs; of metals that will help defeat corrosion in equipment for the off-shore drilling for oil—though these tests are just getting underway; of protective coatings and anti-fouling formulations for wooden boat bottoms and pier pilings; of insulators, insulator mounting, and transformers for electric power lines; of the use of magnesium as a sacrifical anode for protective steel ships and steel piling; of plastic and metallic house screening; of Monel and other metallic roofing sheet; of various types of electrodeposited coatings under chromium for automobile and other bright work; and of the extent to which the base material determines the ability of various types of paint to protect metal articles.

In the files at the field laboratory at Kure Beach and in Inco's Corrosion Engineering Section in New York, are the case records and histories of each of the more than 30,000 specimens on which tests are being currently conducted or which have been completed during the past few years.

From these files already have come the answers, to prayers of waste- and corrosion-conscious industry. These answers frequently have been translated into terms of improved performance and longer life on the part of the industrial equipment and, in a number of instances, in better products for the consuming public.

The Kure Beach project is designed to supplement rather than supplant the laboratory. In many cases, the studies indicate the need for further work in the laboratory. In many more, however, Kure Beach can come up with an answer without further laboratory work. Even in cases where later research is necessary under laboratory conditions, the preliminary studies at the Beach have suggested a path for the subsequent researcher to follow and thus eliminate much groping at the beginning.

Maritime Commission's Program

(Continued from page 135)

of the Merchant Marine to the Nation is lacking and is much needed today. Not enough of our people seem to realize that the United States is a maritime nation. I hope the Commission will take the lead in a program to correct this situation."

Actually, the Commission has been conscious of this situation for some time. Last March Commissioner Carson presented the outline of a maritime promotion program to his colleagues, and on July 15, 1949, a series of recommendations which he prepared were approved. This action by the Commission called for the inauguration of a Merchant Marine promotional, educational, and information program. It authorized a request for needed funds in the 1951 budget and called for the establishment of a National Advisory Board of Marine Promotion.

In laying so much emphasis on the policy-making function of the Maritime Commission, I may seem to have slighted the basic legislation which gave us these directives. I believe I can answer that by a very brief quotation from *Fortune Magazine,* which devoted the entire issue of September 1937 to our Merchant Marine. Here is the quotation:

> "To the question whether the 1936 Act will succeed where past Acts failed, there is only one anwser —it's up to the Maritime Commission."

A second World War has intervened since those words were written. The Maritime Commission and the maritime industry have been subjected to almost every conceivable dislocation — including hypertrophy and partial atrophy. But to me at least, there is no real cleavage between our objectives in 1937 and today. The problems are different, the goal is the same—an adequate and well-balanced Merchant Marine.

If all of us keep that goal in sight we cannot fail.

Cast Iron That Bends

(Continued from page 128)

as 700,000 pounds of the material have been made in one day by the licensees, and as much as 200,000 pounds have been cast in one day by a single licensed foundry. Large castings requiring the pouring of 50,000 pounds of magnesium-treated molten metal for each casting have been produced utilizing the technique of this new development. Thousands of different component parts and as many as 12,000 of a similar part have been made of the patented ductile cast iron.

New, All Metal Eye-Sweep

No longer need the corner of a handkerchief or a cotton swab of questionable sterility be used to remove metal particles, cinders, dirt and similar foreign matter from the eye. The new de luxe Eye-Sweep is a professional instrument designed expressly for this purpose.

It is made entirely of stainless steel. One end is a powerful magnet which picks up iron or steel particles which are not imbedded in the surface. The other end is a wire loop

for non-magnetic particles. Each end is protected by a screw-on cap.

A clip is provided for convenience in carrying.

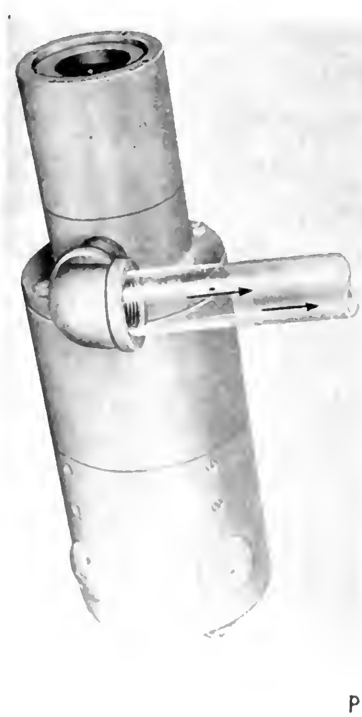
The de luxe Eye-Sweep may be sterilized without affecting the magnet.

Price $5.00 each. For complete information write General Scientific Equipment Co., 2700 W. Huntingdon Street, Philadelphia 32, Pa.

Bogue Bilge Pump

The Marine Division, Bogue Electric Manufacturing Company, has developed a new type high capacity Bilge Pump to be known as model Number Eight.

Model Number Eight will handle either fresh or salt water at 80 gpm with 20′ head. The entire unit is completely submersible. It is powered by an electric motor operating on either 12, 24, 32 or 115-230 volts dc. Model Number Eight is constructed from cast iron and bronze, can also be had in alloy steels.



This unit is particularly well adapted to permanent installation on ships and boats, inaccessible bilges, and low level construction requiring high capacity water removal.

The Model Number Eight can be built on order to handle chemicals and corrosive liquids in comparable capacity.

Check Your Bearings

There are about nine ways that men respond to responsibility and here they are:

I won't is a tramp.
I can't is a quitter.
I don't know is too lazy.
I wish I could is a wisher.
I might is waking up.
I will try is on his feet.
I can is on his way.
I will is at work.
I did is now the "boss."

By checking your answers to the call of duty, you can, by this convenient table, tell exactly where you stand on the ladder of success.—*Clarksburg Christian.*

Maritime Public Relations

(*Continued from page 73*)

will benefit by a program such as the Commission proposes, private profit cannot be the principal reason for the step we propose to take. Foreign trade is an indispensable ingredient in our national prosperity and the only way we can be sure that goods in trade will actually flow to and from our shores is for us to have a merchant marine adequate to meet that requirement.

As part of its long-range merchant marine promotion, the British, in the midst of postwar economic recovery, aided indirectly if not directly by American ECA dollars, have instituted a large scale program to promote British merchant shipping.

The lack of an effective promotional program of our own has contributed greatly to the "sickness" of the American merchant marine to which United States Senator Warren G. Magnuson and others have pointedly referred. America can and must be made aware of the nation's economic stake in an adequate merchant marine. Its place as a part of the international political mechanism of the country should be reorganized. Aside from its economic aspect, the direct contribution of the merchant marine to the defensive strength of our country is beyond accurate appraisal.

However much we may dislike facing the facts, the truth is the American public is not "maritime minded", In fact, many people who live in our sea ports, unless connected with shipping, fail to realize that *if shipping were to cease their community would be on the economic toboggan.* In our eagerness to develop our own natural resources we have failed to realize that in our forward economic march we have found need for certain things in great quantity which must come to our shores in ships from other parts of the world and that our only guarantee that we shall have them is to have an American merchant marine.

Now it is not my aim simply to seek a good public position for the Maritime Commission although such would, within proper limits, be justified. On the contrary, the Commission is sponsoring this program strictly in the national interest. As a sequel to a successful promotional campaign the country's welfare will be advanced, industry will profit, and the Commission's influence will be increased.

It is not enough to urge our people and industry to sail and ship under the American flag. The public must know the many and complex problems which present themselves to the Commission for solution. For instance, the purpose, extent, and accomplishment of the construction and operating subsidy program must be more widely understood. This cannot be left to the shipowners to explain. They would naturally be suspected of self-serving ends. The public must know of the importance of keeping our fleet modern. The country is entitled to know the facts about the superliner and what it means to national prestige. We must make our people proud to sail and ship American. We must not fail to correct the public misunderstanding about maritime labor, on the ships and shore-side.

The question naturally is asked: "Why has not the maritime industry embarked upon such a promotional program?" There is a ready answer. The individual components of the industry, beset with their own problems of readjustment from wartime conditions, have not formulated a comprehensive program of institutional promotion, although some good work has been done.

The real reason why they have not done so is that no program set up by the industry can really succeed

unless coordinated with the agencies of government concerned with maritime affairs, in particular, the Maritime Commission. Fortunately there is now a clear-cut recognition that the establishment of a healthy American merchant marine is a cooperative venture between government and private enterprise. But this complicated relationship is not widely known and understood by the American public. This is particularly true in the area of national defense. Since the government pays the costs of national defense features in the construction of ships, and the problems of national security relate in large measure to the merchant fleet, it is the duty of the Commission to report on and keep the public advised of the use of public funds in this connection.

Right here I must refer to and comment upon an unpleasant aspect of our subject. That is the attitude of some members and elements in industry toward the Commission as such. It matters little what you think of any member of the Commission personally, but it matters much what the public thinks of his agency as an institution. I would be less than frank were I not to tell you that the liberties taken by some in deprecating the Maritime Commission is attributable to a considerable degree to the lack of respect exhibited toward the Commission by some people in the industry. That is a situation which must be changed. The intimate relationship which must exist between the government and the maritime industry demands mutual confidence and respect. A successful promotional program must be buttressed upon that character of performance on the part of all concerned as will permit the presentation to the world of a unified front in a worthy cause. I warn you that unless the United States Maritime Commission merits and obtains the respect of all who deal with it, the days of our merchant marine are numbered and this vital industry will again move falteringly toward a state of decadence.

The Commission does not have in operation now a truly effective promotional campaign. To the best of my knowledge it never has had a carefully planned, formalized maritime program of the scope and quality that befits the power and dignity of the United States or the size and importance of the American merchant marine. So far as I am able to ascertain Congress has never been asked to provide funds for such a program. It is obvious that if the Commission is to discharge effectively its statutory duty it must have funds with which to carry it out. We have the program; what we need now is the money. We have indeed a strong team back of a promotional program, the President, industry, labor, veterans and others who know the importance of the maritime industry to the nation.

Training of Merchant Marine Cadet Midshipmen

(Continued from page 76)

of the college he asserted that the training there is aimed at producing merchant marine officers who are outstanding in every respect.

The Commandant of Cadets at the school asserted it was felt that by coupling traditional excellent professional training with an accredited, recognized college course, the best interests not only of the students but also of the entire maritime profession were being served.

He described in some detail the course of training and study at the New York school, and read a number of complimentary letters that had come from ports visited by its training ship *Empire State* on her world-wide cruises.

Pacific MARINE REVIEW

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